Set Name side by side	Query	Hit Count	Set Name result set
DB=USPT,PGPB,JPAB,EPAB,DWPI; PLUR=YES; OP=ADJ			
L15	L14 not l12	49	L15
L14	l1 and L13	60	L14
L13	thiamine	6562	L13
L12	l1 and L11	21	L12
L11	riboflavin	5402	L11
L10	b vitamins	1086	L10
L9	l1 and L8	2	L9
L8	krebs and vitamin	475	L8
L7	l1 and L6	1	L7
L6	pantothenic and vitamin and niacin	806	L6
L5	l1 and L4	30	L5
L4	vitamins and extracts and (amino acids)	8591	L4
L3	l1 and L2	1	L3
L2	vitamins and extracts and (amino acids) and terpenes	294	L2
L1	((504/$7)!.CCLS.)	14569	L1

END OF SEARCH HISTORY

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Search Results - Record(s) 1 through 10 of 30 returned.

☐ 1. Document ID: US 20020006872 A1

L5: Entry 1 of 30 File: PGPB Jan 17, 2002

PGPUB-DOCUMENT-NUMBER: 20020006872
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020006872 A1

TITLE: Plant-activating agent

PUBLICATION-DATE: January 17, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Suzuki, Tadayuki	Wakayama		JP	
Hayashi, Toshio	Wakayama		JP	
Hayashi, Masaharu	Osaka		JP	
Kamei, Masatoshi	Wakayama		JP	
Kurita, Kazuhiko	Wakayama		JP	

US-CL-CURRENT: 504/117; 504/116.1, 504/118, 504/189, 504/320, 504/326, 504/357

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 2. Document ID: US 20010000325 A1

L5: Entry 2 of 30 File: PGPB Apr 19, 2001

PGPUB-DOCUMENT-NUMBER: 20010000325
PGPUB-FILING-TYPE: new-utility
DOCUMENT-IDENTIFIER: US 20010000325 A1

TITLE: Soil amendment compositions and methods for using the same

PUBLICATION-DATE: April 19, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Yamashita, Thomas T.	Denair	CA	US	

US-CL-CURRENT: 424/401; 504/101, 504/113

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 3. Document ID: US 6312940 B1

L5: Entry 3 of 30 File: USPT Nov 6, 2001

US-PAT-NO: 6312940
DOCUMENT-IDENTIFIER: US 6312940 B1

TITLE: Bacillus species for reducing fusarium head blight in cereals

DATE-ISSUED: November 6, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Schisler; David A.	Morton	IL		
Khan; Naseem I.	Peoria	IL		
Boehm; Michael J.	Worthington	OH		

US-CL-CURRENT: 435/252.5; 424/93.46, 504/117

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 4. Document ID: US 6282837 B1

L5: Entry 4 of 30 File: USPT Sep 4, 2001

US-PAT-NO: 6282837
DOCUMENT-IDENTIFIER: US 6282837 B1

TITLE: Methods of controlling the growth of undesired vegetation with herbicide tolerant plants or plant seeds having altered protoporphyrinogen oxidase activity

DATE-ISSUED: September 4, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Ward; Eric R.	Basel			CHX
Volrath; Sandra	Durham	NC		

US-CL-CURRENT: 504/224; 504/243, 504/285, 800/300

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☑ 5. Document ID: US 6187326 B1

L5: Entry 5 of 30 File: USPT Feb 13, 2001

US-PAT-NO: 6187326
DOCUMENT-IDENTIFIER: US 6187326 B1

TITLE: Soil amendment composition

DATE-ISSUED: February 13, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Yamashita; Thomas T.	Denair	CA	95316-9619	

US-CL-CURRENT: 424/405; 424/116, 504/101, 504/113, 504/116.1, 504/118, 71/1, 71/11, 71/903

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw. Desc | Image

☐ 6. Document ID: US 6121195 A

L5: Entry 6 of 30 File: USPT Sep 19, 2000

US-PAT-NO: 6121195
DOCUMENT-IDENTIFIER: US 6121195 A

TITLE: Methods and compositions for enhancing formyltetrahydropteroylpolyglutamate in plants

DATE-ISSUED: September 19, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Nonomura; Arthur M.	Boxborough	MA	01719	
Nishio; John N.	Laramie	WY	82070	
Benson; Andrew A.	La Jolla	CA	92037	

US-CL-CURRENT: 504/136; 504/143, 504/144, 504/147, 504/149, 504/241, 504/318, 504/324, 504/339

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw. Desc | Image

☐ 7. Document ID: US 6107247 A

L5: Entry 7 of 30 File: USPT Aug 22, 2000

US-PAT-NO: 6107247
DOCUMENT-IDENTIFIER: US 6107247 A

TITLE: Biological control of sprouting in potatoes

DATE-ISSUED: August 22, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Slininger; Patricia J.	Metamora	IL		
Burkhead; Karen D.	East Peoria	IL		
Schisler; David A.	Morton	IL		
Bothast; Rodney J.	East Peoria	IL		

US-CL-CURRENT: 504/117; 424/93.4, 424/93.47, 435/822, 435/874, 435/876

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw. Desc | Image

☐ 8. Document ID: US 6057268 A

L5: Entry 8 of 30 File: USPT May 2, 2000

US-PAT-NO: 6057268
DOCUMENT-IDENTIFIER: US 6057268 A

TITLE: Solid form compositions for treating natural bodies of water

DATE-ISSUED: May 2, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Mehta; Raj J	King of Prussia	PA		

US-CL-CURRENT: 504/117; 435/246, 435/262

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 9. Document ID: US 5994269 A

L5: Entry 9 of 30 File: USPT Nov 30, 1999

US-PAT-NO: 5994269
DOCUMENT-IDENTIFIER: US 5994269 A

TITLE: Method of preparing glyphosate herbicide formulations

DATE-ISSUED: November 30, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Bugg; M. Wayne	Ellisville	MO		
Arnold; Kristin A.	Kirkwood	MO		
White; Randall J.	Miamisburg	OH		

US-CL-CURRENT: 504/127; 504/142, 504/206, 504/320, 504/362

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 10. Document ID: US 5877113 A

L5: Entry 10 of 30 File: USPT Mar 2, 1999

US-PAT-NO: 5877113
DOCUMENT-IDENTIFIER: US 5877113 A

TITLE: Solid form compositions for treating natural bodies of water

DATE-ISSUED: March 2, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Mehta; Raj J.	King of Prussia	PA		

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Search Results - Record(s) 11 through 20 of 30 returned.

☐ 11. Document ID: US 5846908 A

L5: Entry 11 of 30 File: USPT Dec 8, 1998

US-PAT-NO: 5846908
DOCUMENT-IDENTIFIER: US 5846908 A

TITLE: Methods and compositions for enhancing plant growth with p-amino- or p-nitro-benzoic acids

DATE-ISSUED: December 8, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Nonomura; Arthur M.	Boxborough	MA	01719	
Nishio; John N.	Laramie	WY	82070	
Benson; Andrew A.	La Jolla	CA	92037	

US-CL-CURRENT: 504/322; 504/136, 504/142, 504/144, 504/147, 504/149, 504/324

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 12. Document ID: US 5681738 A

L5: Entry 12 of 30 File: USPT Oct 28, 1997

US-PAT-NO: 5681738
DOCUMENT-IDENTIFIER: US 5681738 A

TITLE: Use of 10-oxo-trans-8-decenoic acid in mushroom cultivation

DATE-ISSUED: October 28, 1997

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Beelman; Robert B.	State College	PA		
Ziegler; Gregory R.	State College	PA		
Mau; Jeng-Leun	State College	PA		

US-CL-CURRENT: 435/254.1; 47/1.1, 504/201, 504/321, 71/24, 71/5, 71/901, 71/904

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 13. Document ID: US 5648264 A

L5: Entry 13 of 30 File: USPT Jul 15, 1997

US-PAT-NO: 5648264
DOCUMENT-IDENTIFIER: US 5648264 A

TITLE: Thermocellulolytic bacteria and their uses

DATE-ISSUED: July 15, 1997

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Kume; Shigeru	Fukuoka			JPX

US-CL-CURRENT: 435/264; 422/5, 424/93.41, 435/209, 435/220, 435/252.1, 435/252.4, 435/252.7, 435/277, 435/42, 435/842, 504/117, 71/9, 71/DIG.2

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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☐ 14. Document ID: US 5633435 A

L5: Entry 14 of 30 File: USPT May 27, 1997

US-PAT-NO: 5633435
DOCUMENT-IDENTIFIER: US 5633435 A

TITLE: Glyphosate-tolerant 5-enolpyruvylshikimate-3-phosphate synthases

DATE-ISSUED: May 27, 1997

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Barry; Gerard F.	St. Louis	MO		
Kishore; Ganesh M.	Chesterfield	MO		
Padgette; Stephen R.	Grover	MO		
Stallings; William C.	Glencoe	MO		

US-CL-CURRENT: 800/288; 435/320.1, 435/411, 435/413, 435/414, 435/415, 435/416, 435/417, 435/418, 504/206, 536/23.2, 800/294, 800/300, 800/300.1, 800/312

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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☐ 15. Document ID: US 5605011 A

L5: Entry 15 of 30 File: USPT Feb 25, 1997

US-PAT-NO: 5605011
DOCUMENT-IDENTIFIER: US 5605011 A

TITLE: Nucleic acid fragment encoding herbicide resistant plant acetolactate synthase

DATE-ISSUED: February 25, 1997

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Bedbrook; John R.	Piedmont	CA		
Chaleff; Roy S.	Pennington	NJ		
Falco; Saverio C.	Arden	DE		
Mazur; Barbara J.	Wilmington	DE		
Somerville; Christopher R.	Portola Valley	CA		
Yadav; Narendra S.	Wilmington	DE		

US-CL-CURRENT: 47/58.1R; 435/69.1, 435/70.1, 504/211, 504/212, 504/213, 504/244, 504/247, 536/23.6

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 16. Document ID: US 5587158 A

L5: Entry 16 of 30 File: USPT Dec 24, 1996

US-PAT-NO: 5587158
DOCUMENT-IDENTIFIER: US 5587158 A

TITLE: Biological control for weed trees

DATE-ISSUED: December 24, 1996

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Wall; Ronald	Victoria			CAX
Prasad; Raghubir	Victoria			CAX
Sela; Elaine	Shawnigan Lake			CAX

US-CL-CURRENT: 424/93.5; 424/405, 435/243, 435/254.1, 435/911, 504/117, 504/358

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 17. Document ID: US 5538890 A

L5: Entry 17 of 30 File: USPT Jul 23, 1996

US-PAT-NO: 5538890
DOCUMENT-IDENTIFIER: US 5538890 A

TITLE: Self-delimiting fungal mutants, bioherbicidal compositions thereof, method of preparing thereof and method of using thereof for weed control

DATE-ISSUED: July 23, 1996

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Sands; David C.	Bozeman	MT		
Miller; Roger V.	Bozeman	MT		
Ford; Eugene	Tok	AK		
Kennett; Gregory	Huson	MT		

US-CL-CURRENT: 504/117; 435/171, 435/242, 435/254.1, 435/254.11, 435/260, 435/267, 435/448, 435/911, 47/DIG.10

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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☐ 18. Document ID: US 5463175 A

L5: Entry 18 of 30 File: USPT Oct 31, 1995

US-PAT-NO: 5463175
DOCUMENT-IDENTIFIER: US 5463175 A

TITLE: Glyphosate tolerant plants

DATE-ISSUED: October 31, 1995

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Barry; Gerard F.	St. Louis	MO		
Kishore; Ganesh M.	Chesterfield	MO		

US-CL-CURRENT: 800/300; 435/189, 435/411, 435/413, 435/414, 435/415, 435/416, 435/417, 435/418, 435/69.7, 435/69.8, 435/70.1, 504/198, 536/23.2, 536/23.4, 536/23.7, 536/24.1, 800/300.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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☐ 19. Document ID: US 5321001 A

L5: Entry 19 of 30 File: USPT Jun 14, 1994

US-PAT-NO: 5321001
DOCUMENT-IDENTIFIER: US 5321001 A

TITLE: Photodynamic plant defoliants

DATE-ISSUED: June 14, 1994

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Rebeiz; Constantin A.	Urbana	IL		

US-CL-CURRENT: 504/171; 504/320

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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☐ 20. Document ID: US 5298478 A

L5: Entry 20 of 30 File: USPT Mar 29, 1994

US-PAT-NO: 5298478
DOCUMENT-IDENTIFIER: US 5298478 A

TITLE: Preservative for plants comprising dipicolinic acid

DATE-ISSUED: March 29, 1994

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Yamamoto; Kazuhiro	Tokyo			JPX
Yoshioka; Noriko	Tokyo			JPX
Furukawa; Tadayasu	Chesterfield	MO		

US-CL-CURRENT: 504/115; 426/310, 426/321

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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Terms	Documents
l1 and L4	30

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☐ 21. Document ID: US 5242892 A

L5: Entry 21 of 30 File: USPT Sep 7, 1993

US-PAT-NO: 5242892
DOCUMENT-IDENTIFIER: US 5242892 A

TITLE: Chlorophyll biosynthesis modulators

DATE-ISSUED: September 7, 1993

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Rebeiz; Constantin A.	Urbana	IL		

US-CL-CURRENT: 504/129; 504/130, 504/138, 504/139, 504/140, 504/147

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw. Desc | Image

☐ 22. Document ID: US 5188642 A

L5: Entry 22 of 30 File: USPT Feb 23, 1993

US-PAT-NO: 5188642
DOCUMENT-IDENTIFIER: US 5188642 A

TITLE: Glyphosate-resistant plants

DATE-ISSUED: February 23, 1993

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Shah; Dilip M.	Creve Coeur	MO		
Rogers; Stephen G.	Brussels			BEX
Horsch; Robert B.	St. Louis	MO		
Fraley; Robert T.	St. Louis	MO		

US-CL-CURRENT: 47/58.1R; 435/183, 435/69.1, 435/69.7, 435/69.8, 435/70.1, 504/117, 504/195, 504/197, 504/205, 504/206, 800/300, 800/300.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw. Desc | Image

☐ 23. Document ID: US 5171351 A

L5: Entry 23 of 30 File: USPT Dec 15, 1992

US-PAT-NO: 5171351
DOCUMENT-IDENTIFIER: US 5171351 A

TITLE: Preservative for plants comprising epoxy compounds

DATE-ISSUED: December 15, 1992

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Yamamoto; Kazuhiro	Tokyo			JPX
Yoshioka; Noriko	Tokyo			JPX
Furukawa; Tadayasu	Chesterfield	MO		

US-CL-CURRENT: 504/114; 549/217, 549/512

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC
Draw. Desc | Image

☐ 24. Document ID: US 5163990 A

L5: Entry 24 of 30 File: USPT Nov 17, 1992

US-PAT-NO: 5163990
DOCUMENT-IDENTIFIER: US 5163990 A

TITLE: Photodynamic plant defoliants

DATE-ISSUED: November 17, 1992

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Rebeiz; Constantin A.	Urbana	IL		

US-CL-CURRENT: 504/130; 504/138, 504/166, 504/172

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw. Desc | Image

☐ 25. Document ID: US 5112380 A

L5: Entry 25 of 30 File: USPT May 12, 1992

US-PAT-NO: 5112380
DOCUMENT-IDENTIFIER: US 5112380 A

TITLE: Preservative for plants comprising alkenylphosphonic acids and, optionally, dipicolinic acid

DATE-ISSUED: May 12, 1992

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Yamamoto; Kazuhiro	Tokyo			JPX
Yoshioka; Noriko	Tokyo			JPX
Furukawa; Tadayasu	Chesterfield	MO		

US-CL-CURRENT: 426/321; 504/114, 504/115

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw. Desc | Image

☐ 26. Document ID: US 4995903 A

L5: Entry 26 of 30 File: USPT Feb 26, 1991

US-PAT-NO: 4995903
DOCUMENT-IDENTIFIER: US 4995903 A

TITLE: Alkyl-, Alkenyl- and alkynylnitroguanidines as cytokinin plant growth regulants

DATE-ISSUED: February 26, 1991

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Lutz; Albert W.	Princeton	NJ		
Rodaway; Shirley J.	Newtown	PA		

US-CL-CURRENT: 504/343

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw. Desc | Image

☐ 27. Document ID: US 4822408 A

L5: Entry 27 of 30 File: USPT Apr 18, 1989

US-PAT-NO: 4822408
DOCUMENT-IDENTIFIER: US 4822408 A

TITLE: Alkyl-, alkenyl- and alkynylnitroguanidines as cytokinin plant growth regulants

DATE-ISSUED: April 18, 1989

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Lutz; Albert W.	Princeton	NJ		
Rodaway; Shirley J.	Newtown	PA		

US-CL-CURRENT: 504/343; 426/49

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw. Desc | Image

☐ 28. Document ID: US 4677226 A

L5: Entry 28 of 30 File: USPT Jun 30, 1987

US-PAT-NO: 4677226
DOCUMENT-IDENTIFIER: US 4677226 A

TITLE: Alkyl-, alkenyl- and alkynylnitroguanidines as cytokinin plant growth regulants

DATE-ISSUED: June 30, 1987

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Lutz; Albert W.	Princeton	NJ		
Rodaway; Shirley J.	Newtown	PA		

US-CL-CURRENT: 564/108; 504/343

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☑ 29. Document ID: US 4436547 A

L5: Entry 29 of 30 File: USPT Mar 13, 1984

US-PAT-NO: 4436547
DOCUMENT-IDENTIFIER: US 4436547 A

TITLE: Plant technique

DATE-ISSUED: March 13, 1984

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Sampson; Michael J.	Chichester			GBX

US-CL-CURRENT: 504/136; 504/128, 504/130, 504/326

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 30. Document ID: US 4169717 A

L5: Entry 30 of 30 File: USPT Oct 2, 1979

US-PAT-NO: 4169717
DOCUMENT-IDENTIFIER: US 4169717 A

TITLE: Synergistic plant regulatory compositions

DATE-ISSUED: October 2, 1979

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Ashmead; Harvey H.	Clearfield	UT	84015	

US-CL-CURRENT: 504/126

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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L5: Entry 5 of 30 File: USPT Feb 13, 2001

DOCUMENT-IDENTIFIER: US 6187326 B1
TITLE: Soil amendment composition

Abstract Paragraph Left (1):
Soil amendment compositions and methods for using the same are provided. The subject compositions are aqueous compositions consisting essentially of a carbon-skeleton energy component, a predisposing agent and a vitamin-cofactor component. The subject compositions find use in a variety of soil amendment applications, including: the control of soil born pests and pathogens; the improvement in soil fertility and/or characteristics, e.g. mineral release, water filtration; the neutralization and/or degradation of toxins, etc. Further, an aqueous composition containing 10 to 50% w/w of a molasses and lignosulfonate, as well as 0.001 to 10% w/w of gallic acid and a yeast extract is also disclosed. In addition, the composition does not include nitrogen, phosphorous, zinc, iron or manganese.

Brief Summary Paragraph Right (7):
Soil amendment compositions and methods for their use are provided. The subject compositions are aqueous compositions that include a predisposing agent, a carbon-skeleton-energy component and a vitamin-cofactor component. The subject compositions find use in a variety of different applications, including: the control of soil borne pests or pathogens; the neutralization and/or degradation of toxins; the improvement of soil characteristics, e.g. water permeability; the improvement of soil fertility; etc.

Brief Summary Paragraph Right (8):
Aqueous compositions and methods for their use in soil amendment applications are provided. The subject compositions include a predisposing agent, a carbon-skeleton-energy (CSE) source and a vitamin co-factor component. The subject compositions find use in a variety of different soil amendment applications, where such applications include: reducing the population of soil borne pests or pathogens; neutralizing or degrading soil toxins; improving soil characteristics; improving soil fertility; and the like. In further describing the invention, the compositions are described first in greater detail followed by a discussion of representative soil amendment methods in which the subject compositions find use.

Brief Summary Paragraph Right (11):
A critical component of the subject aqueous compositions is the predisposing agent. By predisposing agent is meant an agent which can traverse the membranes of a target pest or pathogen and thereby weaken the pest or pathogen physiology by virtue of denaturation of key enzymes (e.g. cytochrome oxidase) and/or proteins, and the like. A variety of different compounds are capable of fulfilling the above functional requirements and thereby serving as predisposing agents. As such, predisposing agents of interest include: aromatic amino acids, e.g. tyrosine, phenylalanine, tryptophan; phenols and derivatives and general products or reactants of the Shikimic Acid Pathway, e.g. cinnamic acid, chlorogenic acid, caffeic acid, coumaric acid, catechuic acid, ferulic acid, chorismic acid, quinic acid, gallic acid, gallotannins, scopeletin, dicoumarol, preocenes, phytoalexins such as orchinol, phaseolin, pisatin, isocoumarin, and the like; lignin alcohols e.g. coniferyl, sinapyl, p-coumaryl; flavonoids e.g. cyanidin, anthocyanidin, pelargonidin, delphinidin, malidin, peonidin, petunidin; flavonols and flavones; betalains e.g. betacyanin, betalain, betaxanthin; alkaloids e.g. caffeine, nicotine, theobromine; limonene -1-Methyl-4-(1-Methylethenyl) cyclohexene; p-mentha-1,8-diene; lignosulfonates, e.g. calcium lignosulfonate, potassium lignosulfonate, sodium lignosulfonate, ammonium lignosulfonate; and the like.

Brief Summary Paragraph Right (17):

A second critical component of the subject compositions is the carbon-skeleton-energy (CSE) component. CSE components that find use in the subject compositions are carbon containing substances which provide a readily assimilable source of both carbon and energy for promoting microbial proliferation. Preferably, the CSE component provides a complex array of various carbon compounds such that varied enzymology is induced in microbes present in the target soil. As such, CSE sources that favor ancestral, beneficial species, which normally carry complex enzyme systems (as opposed to more simplified forms hosted by facultative pathogens) are particularly preferred. Generally, the carbon-skeleton-energy component is a C.sub.2 to C.sub.10, usually C.sub.4 to C.sub.8 compound or polymer thereof, e.g. a polymer in which the monomeric units are C.sub.2 to C.sub.10 compounds, such as a polysaccharide. The CSE component may be a single carbon containing compound or a composition of two or more different carbon containing or organic compounds. Compounds and compositions capable of serving as a CSE component include: complex organic compositions, such as molasses (e.g. cane, sugar beet, sorghum, etc.), whey, corn steep liquor, grape syrup, maple syrup, corn syrup, etc; sugars, e.g. sucrose, fructose, glucose, lactose, galactose, dextrose, maltose, raffinose, ribose, ribulose, xylulose, xylose, amylose, arabinose, etc.; sugar phosphates, e.g. fucose-P, galactose-P, glucose-P, lactose-P, maltose-P, mannose-P, ribose-P, ribulose-P, xylose-P, xylulose-P, etc.; sugar alcohols, e.g. adonitol, sorbitol, mannitol, maltitol, ribitol, galactitol, glucitol, etc.; organic acids, e.g. gluccuronic acid, alpha ketoglutaric acid, galactonic acid, glucaric acid, gluconic acid, pyruvic acid, polygalacturonic acid, citric acid, succinic acid, malic acid, isocitric acid, folic acid, etc.; nucleotides and bases, e.g. adenosine, adenosine-P, uridine, uridine-P, thymine, thymine-P, cytosine, cytosine-P, guanine, guanine-P, etc.; and amino acids, e.g. glycine, alanine, leucine, isoleucine, asparagine, tyrosine, phenylalanine, serine, cysteine, valine, proline, methionine, glutamine, threonine, lysine, aspartic acid, glutamic acid, arginine, and the like.

Brief Summary Paragraph Right (20):
The final component is a vitamin-cofactor. A variety of agents are capable of serving as the vitamin-cofactor component of the subject aqueous compositions. Such agents include: yeast extract, yeast, vitamin Bs, e.g. thiamine pyrophosphate, riboflavin, biotin, pantothenic acid, phosphatidylcholine, inositol, PABA, nicotinic acid, folic acid and mixtures thereof, and the like. Of particular interest as a vitamin-cofactor is yeast extract, particularly yeast extract obtained from spray dried extract, as available from Feedstuffs, Inc., Stockton Calif.; California Spray Dry, Stockton, Calif.; and the like. The amount of vitamin-cofactor component present in the composition is sufficient to provide a concentration in the treated soil that ranges from about 0.01 to 10 ppm, usually from about 0.01 to 5.0 ppm and more usually from about 0.01 to 1 ppm. The amount of vitamin co-factor present in the composition generally ranges from about 0.001 to 15% w/w, usually from about 0.001% to 10% w/w and more usually from about 0.01 to 5.0% w/w or 2 to 5% w/w of the composition.

Brief Summary Paragraph Right (25):
The subject aqueous compositions find use in a variety of soil amendment applications, i.e. methods of improving soil. In practicing the subject methods, the aqueous composition is contacted with the soil under conditions sufficient to achieve the desired concentrations of the agents of the composition in the soil. By contact is meant that the composition is introduced into the soil such that the desired concentration of the disparate components of the composition is obtained in the soil. As such, contact can include spraying so that the composition soaks into the soil, injecting the composition into the soil, flooding the soil with the composition, and the like. Contact is performed such that the concentration in the soil of the predisposing agent following treatment is at least about 5 ppm, usually at least about 20 ppm and more usually at least about 60 ppm, where the concentration of the predisposing agent following treatment may be as high as 650 ppm or higher, but generally does not exceed about 200 ppm and usually does not exceed about 60 ppm. Contacting also results in a concentration of the CSE component in the soil that is at least about 5 ppm, usually at least about 20 ppm and more usually at least about 60 ppm, where contact may result in a concentration of the CSE component that is 650 ppm or higher, but generally does not exceed about 200 ppm and usually does not exceed about 60 ppm. In addition, contact of the composition with the soil results in a vitamin-cofactor concentration in the soil that is at least about 0.01 ppm, usually at least about 0.05 ppm and more usually at least about 1.0 ppm, where the vitamin-cofactor concentration may be as high as 10 ppm or higher, but generally does not exceed about 5.0 ppm and usually does not exceed about 1.0 ppm.

Detailed Description Paragraph Table (2):
Final Concentration of Component Material Source Amount % w/w a.i. in Total Mix Carbon Skeleton- Hi-Brix Molasses 35% 17.5% CSE Energy (CSE) Predisposing Agent Ca Lignosulfonate 35% 17.6% Predisp. Agent Gallic Acid 0.10% Vitamin-Cofactor Yeast

Extract 2.5% 1.3% Vit-Cofactor Water Tap Water 27.5% 27.5% Water Hi-Brix Molasses obtained from Westway Terminal, Stockton, CA CaLignosulfonate obtained from Georgia-Pacific Gallic Acid obtained from Sigma Chemical Company Yeast Extract obtained from Sigma Chemical Company

Detailed Description Paragraph Table (3):
Final Concentration of Component Material Source Amount % w/w a.i. in Total Mix CSE Hi Brix Molasses 32% 16.0% CSE Complexing Agent Ca Lignosulfonate 32% 16.0% Cplx Nitrogen Urea (23% N) 5%} 1.7% Nitrogen KNO.sub.3 (13.9% N) 3.8%} Potassium KNO.sub.3 (38.7% K) 3.8% 1.5% Potassium Phosphorus H.sub.3 PO.sub.4 (23.7% P) 3.4% 0.8% Phosphorus Zinc ZnSO.sub.4 -7 H.sub.2 O 0.8% 0.3% Zinc (36% Zn) Iron FeSO.sub.4 -7 H.sub.2 O 0.8% 0.3% Iron (31% Fe) Manganese MnSO.sub.4 -H.sub.2 O 0.8% 0.2% Manganese (28% Mn) Vitamin B Cplx Vitamin B Cplx 1.0% 0.04% B-Complex Water Tap Water 20.4% 20.4% Water

Current US Cross Reference Classification (2):
504/101

Current US Cross Reference Classification (3):
504/113

Current US Cross Reference Classification (4):
504/116.1

Current US Cross Reference Classification (5):
504/118

CLAIMS:

1. An aqueous composition consisting of:

(a) a predisposing agent;

(b) a carbon-skeleton-energy component;

(c) a vitamin-cofactor and

(d) water;

wherein said composition does not include nitrogen, phosphorous, zinc, iron or manganese.

6. An aqueous composition consisting of:

(a) a carbon-skeleton-energy component;

(b) a lignosulfonate;

(c) gallic acid;

(d) a vitamin-cofactor; and

(e) water

wherein said composition does not include nitrogen, phosphorous, zinc, iron or manganese.

8. The composition according to claim 1, wherein said vitamin-cofactor is yeast extract.

12. The composition according to claim 6, wherein said vitamin-cofactor is from about 0.001 to 10% w/w of said composition.

13. An aqueous composition consisting of:

(a) from about 10 to 50% w/w of a molasses;

(b) from about 10 to 50% w/w of a lignosulfonate;

(c) from about 0.001 to 10% w/w of gallic acid;

(d) from about 0.001 to 10% w/w of yeast extract; and

(e) water

wherein said composition does not include nitrogen, phosphorous, zinc, iron or manganese.

17. The composition according to claim 13, wherein said yeast extract makes up from about 2 to 3% w/w of said composition.

19. A method for amending soil, said method comprising:

applying to said soil an aqueous composition consisting of:

(a) from about 10 to 50% w/w of a molasses;

(b) from about 10 to 50% w/w of a lignosulfonate;

(c) from about 0.001 to 10% w/w of gallic acid;

(d) from about 0.001 to 10% w/w of yeast extract; and

(e) water

wherein said composition does not include nitrogen, phosphorous, zinc, iron or manganese.

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L5: Entry 29 of 30 File: USPT Mar 13, 1984

DOCUMENT-IDENTIFIER: US 4436547 A
TITLE: Plant technique

Abstract Paragraph Right (1):
In accordance with the invention, the effect of certain agricultural chemicals, viz. fungicides, herbicides, insecticides, nematocides and plant-growth regulators, is improved by co-administration of them with one or more of the following additives: carbohydrates, organic acids (particularly fatty acids and acids of the Krebs tricarboxylic acid cycle), vitamins and co-enzymes, purine and pyrimidine nucleosides and nucleotides, naturally occurring fats and oils, certain amino acids and (but not when the agricultural chemical is itself a plant-growth regulator) plant-growth regulators. The invention provides compositions containing one or more of the said agricultural chemicals and one or more of the said additives, and methods of improving the harvest of a given crop by applying to it one or more of the said agricultural chemicals and one or more of the said additives, either simultaneously or within up to about ten days of one another.

Brief Summary Paragraph Right (8):
(c) a vitamin or coenzyme, e.g. thiamine, riboflavin, pyridoxine, pyridoxamine, pryidoxal, nicotinamide, folic acid, or a precursor thereof including nicotinic acid, which will normally be applied at 0.01 to 500 g/ha to stimulate metabolic processes dependent on enzymatic action;

Brief Summary Paragraph Right (12):
(g) an amino acid of a type that occurs naturally in plant proteins, e.g. glycine, alanine, valine, leucine, isoleucine, serine, threonine, cysteine, methionine, aspartic acid, glutamic acid, glutamine, asparagine, lysine, hydroxylysine, arginine, histidine, phenylaline, tyrosine, tryptophan, proline or hydroxyproline, which will normally be applied at 1 to 500 g/ha to act as structural units for newly formed proteins or by their degradation to function in a similar manner to fatty acids and carbohydrates;

Brief Summary Paragraph Right (35):
The toxicity of compositions in accordance with the present invention may be reduced by including in the mixture a compound that acts as a purgative or emetic or that acts to delay uptake of the material in the alimentary canal. Suitable purgatives include phenolphthalein, senna extract and castor oil. Apomorphine is a useful emetic, whose effect is enhanced by the presence of ethyl alcohol. The amount of emetic that is added (e.g. to paraquat) is such that if sufficient agricultrual chemical is ingested to cause a toxic response, sufficient emetic is ingested to cause emesis.

Brief Summary Paragraph Type 1 (3):
(3) As precursors of amino acids and nucleotides;

Detailed Description Paragraph Table (1):
Additives per 225 liters Example of spray solution I Glycerol 75 ml. Alkyl phenol ethylene oxide 175 ml. condensate (wetting agent) Nicotinamide 3 g. Pyridoxine 1.5 g. Yeast extract 3 g. II Glucose syrup 500 g. Triton - X 100 (wetting agent) 250 ml. Yeast extract 80 g. III Glycerol 100 ml. Alkyl phenol ethylene oxide 300 ml. condensate (wetting agent) Citric acid 100 g. Sucrose 150 g. IV Glycerol 300 ml. Gibberellic acid 50 g. Alkyl phenoleethylene oxide 200 ml. condensate (wetting agent) V Yeast extract 200 g. Asparagine 20 g. Methionine 15 g. Cysteine 15 g. VI Ascorbic acid 60 g. Nicotinamide 10 g. Glycerol 100 ml. Glutathione 25 g. Alkyl phenol ethylene oxide 200 ml. condensate (wetting agent) VII Corn oil 1000 ml. Nicotinamide 5 g. Pyridoxine 5 g. Yeast extract 10 g. Glycerol 75 ml. VIII Corn oil 750 ml. Gibberellic acid 5 g. Glucose syrup 250 g. IX Olive oil 500 ml. Alkyl phenol ethylene oxide 500 ml. condensate

(wetting agent) Sucrose 200 g. Yeast extract 10 g. X Corn oil 250 ml. Nicotinamide 5 g. Yeast extract 30 g. Methionine 5 g. Glycerol 60 ml. Alkyl phenol ethylene oxide 200 ml. condensate (wetting agent) XI Corn oil 1000 ml. Chlorocholine chloride 800 g. Nicotinamide 5 g. Pyridoxine 5 g. Yeast extract 10 g. Glycerol 75 ml. XII Sucrose 100 g. Yeast extract 5 g. Citric acid 25 g. Asparagine 10 g. Alkyl phenol ethylene oxide 50 ml. condensate (wetting agent) 50 ml. XIII Ascorbic acid 60 g. Nicotinamide 10 g. Glycerol 100 ml. Glutathione 25 g. Alkyl phenol ethylene oxide 200 ml. condensate (wetting agent) Ethyl alcohol 60 ml.

Current US Original Classification (1):
504/136

Current US Cross Reference Classification (1):
504/128

Current US Cross Reference Classification (2):
504/130

Current US Cross Reference Classification (3):
504/326

Other Reference Publication (2):
Suslavicius, Chemical Abstracts, 27040t, "Effect of Some Vitamins and Succini Acid on the Yield of Winter Cereals and Their Quality," vol. 82, 1975, p. 157.

CLAIMS:

1. A method of applying an agricultural chemical comprising the steps of

(A) applying an effective amount of an agricutural chemical to a locus to regulate the growth of plants, said agricultural chemical being selected from the group consisting of

quaternary ammonium compounds of the formula R--N(CH.sub.3).sub.3 --Y in which Y is a non-phytotoxic anion and R is an aliphatic radical of from 1 to 8 carbon atoms containing a non-ionizing nucleophilic group or atom; and

(B) applying an effective amount of additive to modify the metabolism of plants to the same locus as said agricultural chemical not more than 15 days earlier than or more than 15 days later than the application of said agricultural chemical, said additive being vitamins or coenzymes selected from the group consisting of thiamine, riboflavin, pyridoxine, pyridoxamine, pyridoxal, nicotinamide, folic acid, or the precursors of said vitamins or coenzymes.

6. A composition for regulating the growth of plants comprising

(A) an agricultural chemical selected from the growth consisting of

quaternary ammonium compounds of the formula R--N(CH.sub.3).sub.3 --Y in which Y is a non-phytotoxic anion and R is an aliphatic radical of from 1 to 8 carbon atoms containing a non-ionizing nucleophilic group or atom; and

(B) an additive, said additive being vitamins or coenzymes selected from the group consisting of thiamine, riboflavin, pyridoxine, pyridoxamine, pyridoxal, nicotinamide, folic acid, or the precursors of said vitamins or coenzymes, component (B) being provided in an effective amount to stimulate the metabolic process of said plants to enhance the growth-regulating effect of component (A).

L12: Entry 9 of 21 File: USPT Sep 28, 1999

DOCUMENT-IDENTIFIER: US 5958104 A
TITLE: Methods and compositions for enhancing plant growth

Brief Summary Paragraph Right (39):
Suitable oxidants for use as the first compound of the composition include but are not limited to reductases such as cytochrome P450 reductase enzyme, NADPH, NADP, NADH, and NAD; flavins such as flavin mononucleotide (FMN), flavin adenine dinucleotide (FAD), deazaflavin, riboflavin, lumichrome, lumizine, alloxazine, and manganese; nitrobenzoate compounds such as p-nitrobenzoate, polyethylene glycol nitrobenzoate, and nitrophenolate; nitrobenzoic acid compounds such as m-nitrobenzoic acid, p-nitrobenzoic acid (pNBA), 4-chloro-2-nitrobenzoic acid, and 2-chloro-4-nitrobenzoic acid; haloaryl compounds such as iodobenzoate; amine oxides such as tertiary amine-N-oxide; carbamates such as N-(3, 4-methylenedioxyphenyl) carbamates; glycolates and glycolic metabolites such as glycolate, potassium glycolate, glycolic acid, and formate; cytochrome reductases such as cytochrome f, cytochrome c, cytochrome b5, flavocytochrome P450, nitric oxide synthase, and cytochrome P450 tyrosine; azo compounds such as diazolidinylurea, azodicarboxamide; quinone compounds such as anthraquinone sulfonate; bipyridinium compounds such as bis(dimethylaminocarbonyl)propylbipyridinium, and ethylpropenylmethoxyethylbipyridinium; and all salts, hydrates, aldehydes, esters, amines, surfactant-linked derivatives, and other biologically or chemically equivalent derivatives thereof, and combinations of any two or more of the above thereof. Preferred oxidant compounds exhibit a one electron reduction potential (E.sub.o) between about -400 mV and about -165 mV inclusive, more preferably between about -396 mV and about -240 mV.

Current US Cross Reference Classification (1):
504/118

Current US Cross Reference Classification (2):
504/123

Current US Cross Reference Classification (3):
504/189

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Search Results - Record(s) 1 through 5 of 5 returned.

☑ 1. Document ID: US 6318023 B1

L19: Entry 1 of 5 File: USPT Nov 20, 2001

US-PAT-NO: 6318023
DOCUMENT-IDENTIFIER: US 6318023 B1

TITLE: Method and composition for promoting and controlling growth of plants

DATE-ISSUED: November 20, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Yamashita; Thomas T.	Turlock	CA	95360	

US-CL-CURRENT: 47/57.6

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 2. Document ID: US 6309440 B1

L19: Entry 2 of 5 File: USPT Oct 30, 2001

US-PAT-NO: 6309440
DOCUMENT-IDENTIFIER: US 6309440 B1

TITLE: Method and composition for promoting and controlling growth of plants

DATE-ISSUED: October 30, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Yamashita; Thomas T.	Hanford	CA	93230	

US-CL-CURRENT: 71/27; 47/57.6, 47/DIG.10, 71/11, 71/25, 71/26, 71/28, 71/29, 71/30, 71/64.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 3. Document ID: US 5797976 A

L19: Entry 3 of 5 File: USPT Aug 25, 1998

US-PAT-NO: 5797976
DOCUMENT-IDENTIFIER: US 5797976 A

TITLE: Method and composition for promoting and controlling growth of plants

DATE-ISSUED: August 25, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Yamashita; Thomas T.	Hanford	CA	93230	

US-CL-CURRENT: 71/26; 71/11, 71/64.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw. Desc | Image

☑ 4. Document ID: US 5549729 A

L19: Entry 4 of 5 File: USPT Aug 27, 1996

US-PAT-NO: 5549729
DOCUMENT-IDENTIFIER: US 5549729 A

TITLE: Method and composition for promoting and controlling growth of plants

DATE-ISSUED: August 27, 1996

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Yamashita; Thomas T.	Hanford	CA	93230	

US-CL-CURRENT: 71/26; 71/11, 71/64.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw. Desc | Image

☐ 5. Document ID: US 6318023 B1, WO 9113844 A, AU 9173326 A, US 5549729 A, US 5797976 A

L19: Entry 5 of 5 File: DWPI Nov 20, 2001

DERWENT-ACC-NO: 1991-295533
DERWENT-WEEK: 200174
COPYRIGHT 2002 DERWENT INFORMATION LTD
TITLE: Plant growth and crop yield promotional compsn. - also controls pathogenic attack naturally, prevents frost damage, and helps in high energy demand periods

INVENTOR: YAMASHITA, T T

PRIORITY-DATA: 1990US-0490351 (March 8, 1990), 1988US-0242951 (September 9, 1988), 1989US-0354155 (May 19, 1989), 1996US-0682850 (July 12, 1996), 1997US-0795192 (February 4, 1997), 2000US-0615930 (July 13, 2000)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
US 6318023 B1	November 20, 2001		000	A01H001/02
WO 9113844 A	September 19, 1991		108	
AU 9173326 A	October 10, 1991		000	
US 5549729 A	August 27, 1996		027	C05F005/00
US 5797976 A	August 25, 1998		000	C05F005/00

L19: Entry 1 of 5 File: USPT Nov 20, 2001

DOCUMENT-IDENTIFIER: US 6318023 B1
TITLE: Method and composition for promoting and controlling growth of plants

Abstract Paragraph Left (2):
The method is useful for treating vegetation to promotes plant growth and/or crop production, also for treating pollen, seeds, roots and soil and inhibiting growth of insects and micro-organisms. A formulation including an energy/carbon skeleton component, a macro nutrient component and a micro nutrient component is applied, e.g. in aqueous solution by foliar spraying. This is done in a manner to make optimum use of the inherent ability of vegetation to harvest solar energy and to utilize other sources of energy and carbon skeleton, such that the energy and nutrients applied by the method of the invention is a fraction of the energy and carbon skeleton requirements of the vegetation.

Brief Summary Paragraph Right (16):
As the parent molasses may contain potassium concentrations as much as 2.0-7.0%, it may be necessary to omit potassium nitrate. If potassium nitrate is omitted, the nitrogen may be supplied in total by urea (1.25%). Additionally, inositol levels in molasses may reach levels of 5,800-8,000 ppm, in which case this cofactor may be omitted as well. It is important that the pH of the solution be maintained between 5.0-7.5. This latter requirement may be addressed by analyzing the dilution water sources and adjusting extreme deviations with buffers. Approximately one quart of phosphate buffer per hundred gallons of diluted spray mix (i.e. the "Bright Sun" diluted with water for actual spraying) should meet these needs. If the parent molasses has a pH above 7, the standard addition of citric acid and phosphoric acid will adjust this to a manageable level (most molasses have a pH range of between 5-8).

Brief Summary Paragraph Right (23):
As stated above certain ingredients may contain one or more other ingredients. For example, molasses will often contain some one or more of nitrogen, phosphorus, potassium and calcium, also vitamins and cofactors. Not all of such ingredients are always in the proper form. For example, some or all of the nitrogen may be in the form of proteins and some of the calcium may be in insoluble form.

Brief Summary Paragraph Right (40):
The most important are folic acid, biotin, pantothenic acid, nicotinic acid, riboflavin and thiamine. Others may be omitted but their presence is preferred.

Brief Summary Paragraph Right (54):
Additionally it is known that the application of metal activators, cofactors and coenzymes will not only institute activity of an enzyme but by virtue of the former effect greatly accelerate the rate and efficiency of biochemical reactions. Growth promoting, plant hormones also act in a regulatory capacity and as such can act in a similar fashion. When a full range of factors (as found in Bright Sun) are then used in applications to a plant, the potential voids in one or a number of related factors created by accelerated activity from additions of another are nullified. This is so because of the complete, balanced nature of the Bright Sun mix which will allow compensation of an otherwise deficient factor or factors.

Brief Summary Paragraph Right (55):
If, for example, one is able to increase the leaf surface area of the given tree by 40%, theoretically, the tree would be able to harvest an additional 24,000 Kcal (60,000 Kcal.times.0.40=24,000 Kcal). If the metabolic efficiency of the same tree is improved by 30%, an additional 18,000 Kcal of harvested energy would be possible. The sum of these (24,000 Kcal+18,000 Kcal=42,000 Kcal) or 42,000 Kcal would more than compensate for the deficiency of 40,000 Kcal (60,000 Kcal+42,000 Kcal=102,000 Kcal, with a

requirement of 100,000 Kcal). It is by virtue of these phenomena that a superior plant is produced by treatments of Bright Sun without having to directly compensate an energy deficiency. Rather, it is the combined effects of a minute direct addition along with the all important improvement in overall metabolic efficiency which makes it possible to achieve the status of a superior plant. It is the inclusion of a carbon skeleton-energy source in conjunction with additions of macro and micronutrients, cofactors and coenzymes, growth regulators, complexing agents and related factors that prevents a temporary energy deficit within the plant. That is, energies of assimilation for various elements and compounds are compensated from the beginning of treatment and are not met at the total expense of the plant's reserve energy sources. Thus, a break in metabolic efficiency is avoided and increased rates of metabolism induced by treatments are allowed to continue unimpeded. Under traditional methods of plant nutrition it is not uncommon to create a deficiency or imbalance in the biochemical machinery following treatments with one or more elements.

Brief Summary Paragraph Right (57):
The macroscopic manifestations in plants often translates into characters such as increased growth, bud retention, fruit size and quality as well as subtle expressions of tolerance to various forms of environmental stress. A generalized definition of these beneficial factors, then, must emphasize balance and the concepts of "compensatory balanced nutrition". That is, the addition of one factor, such as nitrogen, must take into consideration concomitant needs for energies of assimilation, carbon skeletons to accept nitrogen, the need for cofactors and catalysts and a wide range of other macro and micronutrients. The enhanced rate and activity of a series of biochemical reactions must necessarily create temporary states of deficiency or excess. A "compensatory balance" approach, however, takes all the myriad of factors into consideration. If we were to assign a relative value to these many factors, however, with all else being normal, it is obvious that the energy load of the plant represents the ultimate factor of limitation.

Brief Summary Paragraph Right (58):
It is the purpose of this patent to emphasize these concepts and to demonstrate the necessity of integrating a "compensatory balanced nutrition" (CBN) of plants. Traditional plant nutrition has to date only addressed the need for various mineral elements. While results may appear to be favorable the potentials have yet to be realized. Rather, by addressing the additional energy requirements and certain key cofactors (such as vitamins) it is possible to achieve growth and production which exceed even the most balanced nutrition of mineral elements.

Brief Summary Paragraph Right (131):
The soil environment presents a complex range of integrated factors promoting and/or inhibiting plant growth and reproduction. Foremost among the many influential factors is the nature and density of the microbial populations. From the very moment of sowing or planting, the seed or plants roots become enveloped in the dynamic flux of various soil-borne organisms and directly and/or indirectly are affected in subsequent growth. Cultural practices, nature, the basal soil chemistry and microbial populations interact to either favor or impede growth. Various soil-borne pathogens, for example, are opportunistic, gaining entry and/or establishment during weakened states of plant development. Generally speaking, then, adjustments of the soil environment favoring rapid growth and suppressing soil-borne pathogen colonization would subsequently provide opportunity for optimum seed germination, stand, growth and reproduction of the commercial crop.

Brief Summary Paragraph Right (145):
Commenting further on this example, the bentonate clay and the algea function to adhere the composition to the seeds and to the roots. The added Katy-J assists in germination of the coated seeds and is helpful in promoting proliferation of desired micro-organisms in both seed and root treatment. In application of the composition to roots of seedlings to be planted, it is preferred to prepare a dry mixture of the spray dried mixture described above and of the freeze dried micro-organisms in the proportions described above. This dry mixture may be shipped to and stored by the farmer who may then mix it with water and dip the roots of seedlings in the resulting aqueous product just before planting. The micro-organisms are beneficial in seed germination and plant growth.

Brief Summary Paragraph Left (4):
Vitamins and Cofactors

Brief Summary Paragraph Type 0 (15):
Thiamine-thiamine pyrosphosphate, thiamine monophosphate, thiamine disulfide, thiamine mononitrate, thiamine phosphoric acid ester chloride, thiamine phosphoric acid ester

phosphate salt, thiamine 1,5 salt, thiamine triphosphoric acid ester, thiamine triphosphoric acid salt, yeast, yeast extract

Brief Summary Paragraph Type 0 (16):
Riboflavin-riboflavin acetyl phosphate, flavin adenine dinucleotide, flavin adenine mononucleotide, riboflavin phosphate, yeast, yeast extract

Brief Summary Paragraph Type 0 (55):
Yeast extract: thiamine, riboflavin, nicotinic acid, pyridoxine, folic acid, biotin, pantothenic acid, cyanocobalamin, phosphatidylcholine, PABA (see vitamin and cofactor section for previous "Bright Sun" mix)

Brief Summary Paragraph Type 1 (3):
(3) that traditional irrigation, fertilization and pest control strategies will express the full potential of a plant's growth and reproduction.

Brief Summary Paragraph Type 1 (21):
7. Vitamins and cofactors

Brief Summary Paragraph Table (1):
(Elemental) % w/v Source of Element Macronutrients Nitrogen (N) urea (0.65) Urea, Potassium KN03 (0.60) nitrate total = 1.25% Phosphorus (P) 1.5 Phosphoric acid Potassium (K) 2.0 Potassium nitrate Calcium (Ca) 2.0 Calcium gluconate Magnesium (Mg) 0.5 Magnesium sulfate Sulfur (S) 3.5 Various sulfates Micronutrients Zinc (Zn) 1.0 Zinc sulfate Iron (Fe) 1.0 Ferrous sulfate Manganese (Mn) 1.0 Manganese sulfate Copper (Cu) 0.5 Boric sulfate Boron (B) 0.02 Boric acid Molybdenum (Mo) 0.03 Ammonium molybdate Cobalt (Co) 0.03 Cobalt nitrate Vitamins and Cofactors Thiamine (B1) 0.02 Thiamine hydrochloride Riboflavin (B2) 0.02 Riboflavin Nicotinic acid 0.02 Nicotinic acid Pyridoxine (B6) 0.02 Pyridoxine hydrochloride Folic acid 0.02 Folic acid Biotin 0.02 Biotin Pantothenic acid 0.02 Pantothenic acid (calcium salt) Cyanocobalamin 0.02 vitamin B12 Phosphatidylcholine 0.02 Lecithin Inositol 0.02 Inositol Para-aminobenzoic acid 0.02 PABA Enhancement Agents Seaweed extract 2.5% (v/v) Seaweed extract (cold processed) Citric acid 10.0 gr/gal mix Citric acid Katy-J complexing 0.5 gr/gal mix Katy-J Agent (JKT Corp.) Xanthan gum 0.07 (v/v) Xanthan gum Sugars and Carbon Skeletons Molasses 40% (TSI) Beet molasses Buffers Phosphate buffer 0.02% Phosphate buffer (pH = 6)

Brief Summary Paragraph Table (2):
TABLE 1 (Elemental) % w/v Macronutrients N 0.000001-20 P 0.000001-20 K 0.000001-20 Ca 0.000001-20 Mg 0.000001-20 S 0.000001-20 Micronutrients Zn 0.000001-20 Fe 0.000001-20 Mn 0.000001-20 Cu 0.000001-20 B 0.000001-20 Mo 0.000001-20 Co 0.000001-20 Vitamins and Cofactors Thiamine 0.000001-5 Riboflavin 0.000001-5 Nicotinic acid 0.000001-5 Pyridoxine 0.000001-5 Folic acid 0.000001-5 Biotin 0.000001-5 Pantothenic acid 0.000001-5 Cyanocobalamin 0.000001-5 Phosphatidylcholine 0.000001-5 Inositol 0.000001-5 Para-aminobenzoic acid 0.000001-5 Enhancement Agents Seaweed extract 0.000001-50 v/v Citric acid 0.000001-1,000 gr/gal mix Katy-J 0.000001-1,000 gr/gal mix Xanthan gum 0.000001-5 w/w Sugars and Carbon Skeletons Molasses 0.000001-80% TSI Buffers Phosphate buffer 0.000001-5% v/v

Brief Summary Paragraph Table (3):
TABLE 1A RANGE OF PROPORTIONS BRIGHT SUN A. Carbon Skeleton/Energy Component 25.00-70.00% B. Macronutrient Component Nitrogen 0.30-5.00% Phosphorus 0.20-5.00% Potassium 0.30-5.00% Calcium 0.10-5.00% Magnesium 0.05-1.50% Sulfur 0.10-5.00% C. Micronutrient Component Zinc 0.05-2.00% Manganese 0.05-2.00% Iron 0.05-2.00% Copper 0.01-0.10% Boron 0.004-0.05% Molybdenum 0.001-0.02% Cobalt 0.001-0.02% D. Complexing Agent(s) Citric Acid, etc 0.005-0.50% Lignosulfonate 0.005-1.00% E. Vitamin-Cofactor Component Folic Acid 0.001-0.10% Thiamine 0.001-0.10% Riboflavin 0.001-0.10% Nicotinic Acid 0.001-0.10% Pyridoxine 0.001-0.10% Biotin 0.001-0.10% Pantothenic Acid 0.001-0.10% Cyanocobalamin 0.001-0.10% Phosphatidylcholine 0.001-0.10% Inositol 0.001-0.10% PABA 0.001-0.10% F. Natural Source of Growth Regulator Seaweed Extract 0.025-1.00% G. Microbialstat, e.g. Proprionic Acid 0.005-0.50% H. Gum, e.g. Xanthan Gum 0.0005-0.10%

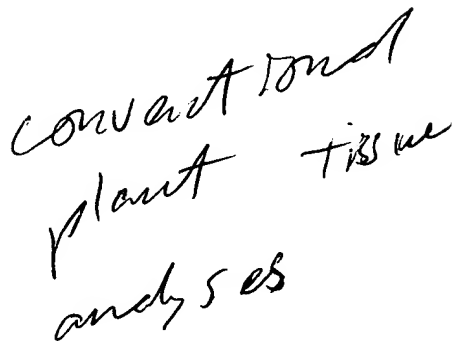
Brief Summary Paragraph Table (6):
Element Concentration in Molasses Mix Calcium 1.0% Potassium 0.6% Zinc 0.5% Magnesium 0.3% Nitrogen 0.7% Phosphorus 0.3% Manganese 0.08% Molybdenum 0.008% Iron 0.1% Copper 0.02% Boron 0.02% Cobalt 0.02% Thiamine (B1) 0.01% Riboflavin (B2) 0.01% Nicotinic Acid 0.01% Pyridoxine (B6) 0.01% Folic Acid 0.01% Biotin 0.01% Cobalamin (B12) 0.01% % invert sugars 40.00%

Brief Summary Paragraph Table (7):
Element Concentration in Molasses Mix Nitrogen 1.2% Phosphorus 1.0% Potassium 3.6%

Calcium 1.1% Zinc 0.5% Magnesium 0.3% Manganese 0.2% Molybdenum 0.01% Iron 0.3% Copper 0.025% Boron 0.02% Cobalt 0.02% Thiamine (B1) 0.005% Riboflavin (B2) 0.005% Nicotinic Acid 0.005% Paraminobenzoic Acid (PABA) 0.005% Pyridoxine (B6) 0.005% Folic Acid 0.005% Inositol 0.005% Biotin 0.005% Cobalamin (B12) 0.005% Katy-J Complexing Agent 0.5 grams/acre citric Acid 10.0 grams/acre % invert sugars 40.0%

Set Name side by side	Query	Hit Count	Set Name result set
DB=USPT,PGPB,JPAB,EPAB,DWPI; PLUR=YES; OP=ADJ			
L14	l12 and L13	1	L14
L13	L2 and l6	6	L13
L12	l2 and l5	21	L12
L11	l2 same l5	0	L11
L10	l2 same l6	0	L10
L9	l2 same l6L8	0	L9
L8	l2 same L7	1	L8
L7	nitrate$1	143892	L7
L6	ascorb$3	50222	L6
L5	chlorophyl$3	6434	L5
L4	l2 same L3	8	L4
L3	fertili$7 or (plant growth)	97929	L3
L2	(plant tissue$1) near2 analy$5	102	L2
L1	plant tissue analy$5	30	L1

END OF SEARCH HISTORY



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Search Results - Record(s) 1 through 1 of 1 returned.

☑ 1. Document ID: US 3929446 A

L8: Entry 1 of 1 File: USPT Dec 30, 1975

US-PAT-NO: 3929446
DOCUMENT-IDENTIFIER: US 3929446 A

TITLE: Slow nitrogen releasing fertilizers and methods of making the same

DATE-ISSUED: December 30, 1975

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Trocino; Frank S.	Eugene	OR		

US-CL-CURRENT: 71/23; 71/28, 71/29, 71/30, 71/33, 71/58, 71/61

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End of Result Set

☐ Generate Collection Print

L8: Entry 1 of 1 File: USPT Dec 30, 1975

DOCUMENT-IDENTIFIER: US 3929446 A
TITLE: Slow nitrogen releasing fertilizers and methods of making the same

Detailed Description Text (24):
Plant tissue samples were taken before and after fertilizing at approximately 15 day intervals. The top 6 inches of the plant were taken for the samples and such included all young leaves and stems. Samples were analyzed by an independent testing laboratory for total nitrogen. Analysis of the plant tissue samples prior to fertilizing showed 1.65 percent total nitrogen and 110 p.p.m. nitrate nitrogen content.

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Search Results - Record(s) 1 through 10 of 21 returned.

☐ 1. Document ID: US 20020002715 A1

L12: Entry 1 of 21 File: PGPB Jan 3, 2002

PGPUB-DOCUMENT-NUMBER: 20020002715
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020002715 A1

TITLE: High level production of p-hydroxybenzoic acid in green plants

PUBLICATION-DATE: January 3, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Meyer, Knut	Wilmington	DE	US	
Viitanen, Paul V.	West Chester	PA	US	
Van Dyk, Drew E.	Wilmington	DE	US	

US-CL-CURRENT: 800/288; 435/69.7, 435/69.8, 800/278, 800/298

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 2. Document ID: US 20010026939 A1

L12: Entry 2 of 21 File: PGPB Oct 4, 2001

PGPUB-DOCUMENT-NUMBER: 20010026939
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20010026939 A1

TITLE: Insecticidal cotton plant cells

PUBLICATION-DATE: October 4, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Rice, Douglas	Des Moines	IA	US	
Carozzi, Nadine	Raleigh	NC	US	
Anderson, David M.	Placentia	CA	US	
Rajasekaran, Kanniah	Metairie	LA	US	
Rangan, Thirumale S.	Lubbock	TX	US	
Yenofsky, Richard L.	Arcadia	CA	US	
Lotstein, Richard	Carrboro	NC	US	
Framond, Annick de	Pittsboro	NC	US	

US-CL-CURRENT: 435/419

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 3. Document ID: US 6448476 B1

L12: Entry 3 of 21 File: USPT Sep 10, 2002

US-PAT-NO: 6448476
DOCUMENT-IDENTIFIER: US 6448476 B1

TITLE: Plants and plant cells transformation to express an AMPA-N-acetyltransferase

DATE-ISSUED: September 10, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Barry; Gerard F.	St. Louis	MO		

US-CL-CURRENT: 800/300; 435/193, 435/411, 435/413, 435/414, 435/415, 435/416, 435/417, 435/418, 435/419, 435/422, 435/427, 435/468, 435/471, 435/69.7, 435/69.8, 800/278, 800/287, 800/288, 800/298

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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☐ 4. Document ID: US 6380372 B1

L12: Entry 4 of 21 File: USPT Apr 30, 2002

US-PAT-NO: 6380372
DOCUMENT-IDENTIFIER: US 6380372 B1

TITLE: Barley gene for Thioredoxin and NADP-thioredoxin reductase

DATE-ISSUED: April 30, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Cho; Myeong-Je	Alameda	CA		
del Val; Gregorio	El Cerrito	CA		
Caillau; Maxime	Verdun sur Garonne			FR
Lemaux; Peggy G.	Moraga	CA		
Buchanan; Bob B.	Berkeley	CA		

US-CL-CURRENT: 536/23.1; 435/183, 435/252.1, 435/320.1, 435/410, 435/69.1, 530/412, 800/278, 800/295, 800/298

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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☐ 5. Document ID: US 6087563 A

L12: Entry 5 of 21 File: USPT Jul 11, 2000

US-PAT-NO: 6087563
DOCUMENT-IDENTIFIER: US 6087563 A

TITLE: Cloned arabidopsis p-hydroxyphenyl pyruvic acid dioxygenase DNA

DATE-ISSUED: July 11, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
DellaPenna; Dean	Reno	NV		
Norris; Susan R.	Tucson	AZ		

US-CL-CURRENT: 800/317.4; 435/243, 435/252.3, 435/320.1, 435/419, 536/23.2, 536/23.6, 800/278, 800/298

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 6. Document ID: US 6040504 A

L12: Entry 6 of 21 File: USPT Mar 21, 2000

US-PAT-NO: 6040504
DOCUMENT-IDENTIFIER: US 6040504 A

TITLE: Cotton promoter

DATE-ISSUED: March 21, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Rice; Douglas	Durham	NC		
Carozzi; Nadine	Raleigh	NC		
Anderson; David M.	Altadena	CA		
Rajasekaran; Kanniah	Sierra Madre	CA		
Rangan; Thirumale S.	Pasadena	CA		
Yenofsky; Richard	Arcadia	CA		
Lotstein; Richard	Durham	NC		

US-CL-CURRENT: 800/314; 435/252.3, 435/320.1, 435/419, 536/23.1, 536/24.1, 800/298

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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☐ 7. Document ID: US 5981837 A

L12: Entry 7 of 21 File: USPT Nov 9, 1999

US-PAT-NO: 5981837

DOCUMENT-IDENTIFIER: US 5981837 A

TITLE: Method for regulation of plant lignin composition

DATE-ISSUED: November 9, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Chapple; Clint	West Lafayette	IN		

US-CL-CURRENT: 800/278; 435/410, 435/468, 435/469, 536/23.6

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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☐ 8. Document ID: US 5908971 A

L12: Entry 8 of 21 File: USPT Jun 1, 1999

US-PAT-NO: 5908971
DOCUMENT-IDENTIFIER: US 5908971 A

TITLE: Crucifer ACC synthase and uses thereof

DATE-ISSUED: June 1, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Van Der Straeten; Dominique	Gent			BE
Goodman; Howard	Newton Center	MA		
Van Montagu; Marc	Brussels			BE

US-CL-CURRENT: 800/298; 435/320.1, 435/419, 435/69.1, 536/24.1, 800/283

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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☐ 9. Document ID: US 5898097 A

L12: Entry 9 of 21 File: USPT Apr 27, 1999

US-PAT-NO: 5898097
DOCUMENT-IDENTIFIER: US 5898097 A

TITLE: Resistance to virus infection using modified viral movement protein

DATE-ISSUED: April 27, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Beachy; Roger N.	La Jolla	CA		
Lapidot; Moshe	Jerusalem			IL
Gafny; Ron	Tel-Aviv			IL

US-CL-CURRENT: 800/279; 435/440, 435/468, 435/69.1, 536/23.72

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 10. Document ID: US 5869720 A

L12: Entry 10 of 21 File: USPT Feb 9, 1999

US-PAT-NO: 5869720
DOCUMENT-IDENTIFIER: US 5869720 A

TITLE: Transgenic cotton plants producing heterologous peroxidase

DATE-ISSUED: February 9, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
John; Maliyakal E.	Middleton	WI		

US-CL-CURRENT: 800/314; 536/24.1, 800/287

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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Search Results - Record(s) 11 through 20 of 21 returned.

☐ 11. Document ID: US 5650555 A

L12: Entry 11 of 21 File: USPT Jul 22, 1997

US-PAT-NO: 5650555
DOCUMENT-IDENTIFIER: US 5650555 A

TITLE: Transgenic plants producing polyhydroxyalkanoates

DATE-ISSUED: July 22, 1997

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Somerville; Christopher R.	Okemos	MI		
Poirier; Yves	East Lansing	MI		
Dennis; Douglas E.	Weyers Cave	VA		

US-CL-CURRENT: 800/264; 435/135, 435/320.1, 435/69.1, 536/23.7, 800/281, 800/288, 800/298, 800/317.2, 800/317.3, 800/317.4, 800/322

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

☐ 12. Document ID: US 5608148 A

L12: Entry 12 of 21 File: USPT Mar 4, 1997

US-PAT-NO: 5608148
DOCUMENT-IDENTIFIER: US 5608148 A

TITLE: Transgenic cotton plants producing heterologous peroxidase

DATE-ISSUED: March 4, 1997

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
John; Maliyakal E.	Middleton	WI		

US-CL-CURRENT: 800/314; 435/419

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

☐ 13. Document ID: US 5602321 A

L12: Entry 13 of 21 File: USPT Feb 11, 1997

US-PAT-NO: 5602321
DOCUMENT-IDENTIFIER: US 5602321 A

TITLE: Transgenic cotton plants producing heterologous polyhydroxy(e) butyrate bioplastic

DATE-ISSUED: February 11, 1997

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
John; Maliyakal	Middleton	WI		

US-CL-CURRENT: 800/314; 435/252.3, 435/419, 435/69.1, 536/23.1, 536/23.2, 536/23.6, 536/24.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 14. Document ID: US 5599670 A

L12: Entry 14 of 21 File: USPT Feb 4, 1997

US-PAT-NO: 5599670
DOCUMENT-IDENTIFIER: US 5599670 A

TITLE: .beta.-glucuronidase and glucuronide permease gene system

DATE-ISSUED: February 4, 1997

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Jefferson; Richard A.	Canberra			AU

US-CL-CURRENT: 435/6; 435/183, 435/200, 435/252.3, 435/252.33, 435/320.1, 435/325, 435/418, 435/419, 435/455, 435/468, 435/469, 435/476, 514/44, 536/23.2, 536/23.7, 536/24.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 15. Document ID: US 5563324 A

L12: Entry 15 of 21 File: USPT Oct 8, 1996

US-PAT-NO: 5563324
DOCUMENT-IDENTIFIER: US 5563324 A

TITLE: Transgenic plants with altered polyol content

DATE-ISSUED: October 8, 1996

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Tarczynski; Mitchell C.	Tucson	AZ		
Jensen; Richard G.	Tucson	AZ		
Bohnert; Hans J.	Tucson	AZ		
Vernon; Daniel M.	Tucson	AZ		

US-CL-CURRENT: 800/284; 435/190, 435/193, 435/69.1, 435/70.1, 435/72, 800/298, 800/317.3

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw. Desc | Image

☐ 16. Document ID: US 5432081 A

L12: Entry 16 of 21 File: USPT Jul 11, 1995

US-PAT-NO: 5432081
DOCUMENT-IDENTIFIER: US 5432081 A

TITLE: Host cells transformed with the E. coli glucoronide permease gene

DATE-ISSUED: July 11, 1995

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Jefferson; Richard A.	Canberra Act			AU

US-CL-CURRENT: 435/325; 435/183, 435/252.3, 435/252.33, 435/320.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw. Desc | Image

☐ 17. Document ID: US 5268463 A

L12: Entry 17 of 21 File: USPT Dec 7, 1993

US-PAT-NO: 5268463
DOCUMENT-IDENTIFIER: US 5268463 A

TITLE: Plant promoter .alpha.-glucuronidase gene construct

DATE-ISSUED: December 7, 1993

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Jefferson; Richard A.	Cambridge			GB2

US-CL-CURRENT: 536/23.7; 435/200, 435/320.1, 536/24.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw. Desc | Image

☑ 18. Document ID: US 5242892 A

L12: Entry 18 of 21 File: USPT Sep 7, 1993

US-PAT-NO: 5242892
DOCUMENT-IDENTIFIER: US 5242892 A

TITLE: Chlorophyll biosynthesis modulators

DATE-ISSUED: September 7, 1993

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Rebeiz; Constantin A.	Urbana	IL		

US-CL-CURRENT: 504/129; 504/130, 504/138, 504/139, 504/140, 504/147

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw. Desc | Image

☐ 19. Document ID: US 4872899 A

L12: Entry 19 of 21 File: USPT Oct 10, 1989

US-PAT-NO: 4872899
DOCUMENT-IDENTIFIER: US 4872899 A

TITLE: Treatment of plant chlorosis with rhodotorulic acid

DATE-ISSUED: October 10, 1989

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Miller; Gene W.	Providence	UT		

US-CL-CURRENT: 71/11; 71/27, 71/903, 71/DIG.2

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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☐ 20. Document ID: US 4414839 A

L12: Entry 20 of 21 File: USPT Nov 15, 1983

US-PAT-NO: 4414839
DOCUMENT-IDENTIFIER: US 4414839 A

TITLE: Gas sensing apparatus and method

DATE-ISSUED: November 15, 1983

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Dilley; David R.	East Lansing	MI		
Lee; Julian J. L.	Lansing	MI		
Saltveit, Jr.; Mikal E.	Raleigh	NC		

US-CL-CURRENT: 73/23.4; 422/98, 73/31.06

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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Search Results - Record(s) 21 through 21 of 21 returned.

☑ 21. Document ID: US 4303610 A

L12: Entry 21 of 21 File: USPT Dec 1, 1981

US-PAT-NO: 4303610
DOCUMENT-IDENTIFIER: US 4303610 A

TITLE: Test kit for field analysis of plant tissue magnesium and calcium

DATE-ISSUED: December 1, 1981

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Sardisco; John B.	Shreveport	LA		
Phillips; Carroll O.	Shreveport	LA		

US-CL-CURRENT: 422/61; 422/101, 422/104, 436/79

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw. Desc | Image

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L12: Entry 18 of 21 File: USPT Sep 7, 1993

DOCUMENT-IDENTIFIER: US 5242892 A
TITLE: Chlorophyll biosynthesis modulators

Abstract Text (1):
Plant and insect controlling compositions comprising .delta.-aminolevulinic acid and/or one or more chlorophyll and porphyrin-heme biosynthesis modulators; and methods of making and using the compositions.

Brief Summary Text (5):
The following terms, as used hereinbelow, have the following meaning unless expressly stated to the contrary: Alk=(C.sub.1 -C.sub.10)alkyl group; ALA=.delta.-aminolevulinic acid; Chl=chlorophyll; Chlide a=chlorophyllide a; coprogen=coproporphyrinogen; cv=cultivar; dicot=dicotyledenous plant; DP=dipyridyl; DV=divinyl; E=ester; F.Al=fatty alcohol; LWMP=longer wavelength metalloporphyrins (the putative intermediates of ring E formation); M=methylation; ME =methyl ester; Me=methyl; Me.P=methylpropionate; monocot=monocotyledenous plant; MPE=Mg-protoporphyrin monoester; MP(E)=mixture of MPE and Mg-protoporphyrin IX; MV=monovinyl; P=esterification with geranyl geraniol, followed by stepwise conversion of the latter to phytol; PBG=porphobilinogen; Pchl=protochlorophyll; Pchlide=protochlorophyllide; Phy=phytol; Proto=protoporphyrin IX; Protogen=protoporphyrinogen IX; Urogen=uroporphyrinogen, var=variety.

Detailed Description Text (7):
It would be a significant and useful advance in the art to have a chemical composition capable of causing defoliation and/or defoliation and fruit drop in plants, particularly deciduous fruit trees, via a mechanism involving one or more naturally occurring intermediates of the chlorophyll biosynthetic pathway and which alleviates in turn the disadvantages associated with present methods for defoliation and fruit drop.

Detailed Description Text (8):
Chlorophyll biosynthesis is a major biological phenomenon in the biosphere and is mandatory for the biosynthesis of photosynthetic membranes during greening and for the repair and maintenance of the Chl in mature green plants. The chlorophylls are a group of Mg-tetrapyrroles which in green plants catalyze the conversion of solar energy into chemical energy via the process of photosynthesis. There are two basic classes of chlorophyll, designated chlorophyll (Chl a) and chlorophyll b (Chl b); Chl is involved in the collection of solar energy and its conversion to chemical energy whereas Chl b is believed to be involved only in the collection of solar energy.

Detailed Description Text (11):
(a) Dark divinyl/light divinyl (DDV/LDV). In this greening group, chlorophyll formation proceeds via the DV-enriched protochlorophyllide pools at daybreak and in daylight.

Detailed Description Text (12):
(b) Dark monovinyl/light divinyl (DMV/LDV). In this greening group, chlorophyll formation proceeds via the MV-enriched protochlorophyllide pools at daybreak and via the DV-enriched protochlorophyllide pools in daylight.

Detailed Description Text (13):

(c) Dark monovinyl/light monovinyl (DMV/LMV). In this greening group, chlorophyll formation proceeds via the MV-enriched protochlorophyllide pools in darkness and via the MV-enriched protochlorophyllide pools at daybreak and in daylight.

Detailed Description Text (14):
(d) Dark divinyl/light monovinyl (DDV/LMV). In this pathological greening group, chlorophyll formation proceeds via the DV-enriched protochlorophyllide pools at daybreak and via the MV-enriched protochlorophyllide pools in daylight.

Detailed Description Text (15):
As can be seen from FIG. 2, .delta.-aminolevulinic acid (ALA) is a 5-carbon amino acid. ALA is found in most living animal and plant cells and is the primary tetrapyrrole precursor. It is available from a variety of specialty chemical sources, e.g., Sigma Chemical Co., St. Louis, Mo. and Biosynth International, Skokie, Ill. It is known that excised plant tissues treated in the laboratory with small amounts of ALA will synthesize and accumulate Pchlide, which is the immediate precursor of Chlide a and of Chl a, and that ALA will induce the accumulation of earlier tetrapyrrole intermediates of the Chl biosynthetic pathway, such as coproporphyrin, Proto, and MP(E). Once the ALA has stimulated the synthesis of the tetrapyrrole intermediates, they are normally converted in the presence of sunlight into the various forms of Chl a, as described in FIG. 1. However, this rate-limiting conversion does not occur to any great extent in darkness; without sunlight, the tetrapyrrole intermediates accumulate in small amounts in their respective metabolic pools. Upon exposure to light, the conversion to Chl a resumes and the pools are depleted. In 1974, Castelfranco, P. A., Rich, P. M., and Beal, S. I., Plant Physiol. 53:615-618 noticed while studying the lag phase during greening of etiolated (dark grown) tissue that excised cucumber cotyledons soaked in ALA for 16 hours in the dark underwent visible tissue damage upon subsequent exposure to light, which was attributed to tetrapyrroles formed from exogenous ALA. This phenomenon was regarded as a nuisance to be avoided by illumination with red light of very low intensity or by illumination with intermittent light. It was believed that the accumulation of tetrapyrroles due to exogenous ALA was a phenomenon attributable to the peculiar circumstances of etiolation. Indeed, once the greening of etiolated tissue is initiated, the biosynthesis of chlorophyll proceeds at an abnormally high rate not found in normal green tissue.

Detailed Description Text (17):
Copending application Ser. No. 06/895,529 (U.S. Pat. No. 5,127,938), the disclosure of which application is expressly incorporated herein by reference, describes herbicidal compositions comprising one or more compounds selected from the group consisting of .delta.-aminolevulinic acid, inducers of .delta.-aminolevulinic acid synthesis in plants, enhancers of .delta.-aminolevulinic acid conversion to photodynamic tetrapyrroles in plants, and inhibitors of conversion of divinyl tetrapyrroles to monovinyl tetrapyrroles in plants; methods for inducing the accumulation of photodynamic tetrapyrroles in living plants using said compositions, and methods of controlling plants using said compositions. These compositions were discovered to have a herbicidal effect on plants as the result of the accumulation of tetrapyrroles in amounts greater than those normally found in the plants. This was surprising because mature green plants synthesize chlorophyll only at a rate sufficient to keep up with leaf expansion and repair, and it had not been previously believed that this rate would be sufficient to allow accumulation of amounts of tetrapyrroles large enough to result in photodynamic injury.

Detailed Description Text (37):
The invention is broadly directed to compositions for causing defoliation and/or fruit drop in whole, living plants and methods for defoliating and/or causing fruit drop in whole, living plants. Thus, in one embodiment, the invention is a plant defoliating composition comprising a plant defoliating effective amount of .delta.-aminolevulinic acid or .delta.-aminolevulinic acid in combination with one or more chlorophyll biosynthesis modulators and a suitable carrier.

Detailed Description Text (38):
In another embodiment, the invention is a plant defoliating composition comprising a plant defoliating effective amount of .delta.-aminolevulinic acid in combination with one or more chlorophyll biosynthesis modulators which are selected from the

group consisting of inducers of .delta.-aminolevulinic acid synthesis, enhancers of .delta.-aminolevulinic acid conversion to tetrapyrroles and inhibitors of conversion of divinyl tetrapyrroles to monovinyl tetrapyrroles.

Detailed Description Text (39):
Another embodiment of the invention is a method for defoliating a plant comprising the steps of contacting the plant with a defoliating effective amount of .delta.-aminolevulinic acid, one or more chlorophyll biosynthesis modulators, or .delta.-aminolevulinic acid in combination with one or more chlorophyll biosynthesis modulators and allowing the contacted plant to be exposed to light.

Detailed Description Text (40):
In another embodiment, the invention is a method for defoliating a plant comprising the steps of contacting the plant with a defoliating effective amount of .delta.-aminolevulinic acid in combination with one or more chlorophyll biosynthesis modulators and allowing the contacted plant to be exposed to light.

Detailed Description Text (41):
In still another embodiment, the invention is a method for defoliating a plant comprising the steps of contacting the plant with a defoliating effective amount of .delta.-aminolevulinic acid, one or more chlorophyll biosynthesis modulators, or .delta.-aminolevulinic acid in combination with one or more chlorophyll biosynthesis modulators, exposing the contacted plant to a substantial absence of light at wavelengths of 300 to 700 mM and then exposing the contacted plant to light.

Detailed Description Text (42):
A further embodiment of the invention is a composition for causing defoliation and fruit drop in a deciduous fruit tree comprising an amount effective to cause defoliation and fruit drop in a deciduous fruit tree of .delta.-aminolevulinic acid or .delta.-aminolevulinic acid in combination with one or more chlorophyll biosynthesis modulators and a suitable carrier.

Detailed Description Text (43):
Another embodiment of the invention is a composition for causing defoliation and fruit drop in a deciduous fruit tree comprising an amount effective to cause defoliation and fruit drop in a deciduous fruit tree of .delta.-aminolevulinic acid in combination with one or more chlorophyll biosynthesis modulators capable of causing the foliage of the tree to accumulate levels of tetrapyrroles which are selected from the group consisting of inducers of .delta.-aminolevulinic acid synthesis, enhancers of .delta.-aminolevulinic acid conversion to tetrapyrroles and inhibitors of the conversion of divinyl tetrapyrroles to monovinyl tetrapyrroles.

Detailed Description Text (45):
Still another embodiment of the invention is a method for causing defoliation and fruit drop in a deciduous fruit tree comprising the steps of contacting the tree with an amount effective to cause defoliation and fruit drop in the tree of .delta.-aminolevulinic acid, one or more chlorophyll biosynthesis modulators, or .delta.-aminolevulinic acid in combination with one or more chlorophyll biosynthesis modulators and allowing the contacted tree to be exposed to light.

Detailed Description Text (46):
A further embodiment of the invention is directed to a method for causing defoliation and fruit drop in a deciduous fruit tree comprising the steps of contacting a tree with an amount effective to cause defoliation and fruit drop in the tree of .delta.-aminolevulinic acid, one or more chlorophyll biosynthesis modulators, or .delta.-aminolevulinic acid in combination with one or more chlorophyll biosynthesis modulators, exposing the contacted tree to a substantial absence of light at wavelengths of 300 to 700 mM and then exposing the contacted tree to light.

Detailed Description Text (51):
The foliage of a plant can be induced to accumulate tetrapyrroles because foliage is capable of synthesizing tetrapyrroles via the chlorophyll biosynthetic pathway. In contrast, "woody" parts of a plant, e.g., bark or stalk, do not actively synthesize tetrapyrroles and have sufficient carbohydrate reserves to recover from desiccation

so that, notwithstanding desiccation of the foliage, the plant does not die.

Detailed Description Text (59):
As used herein, the term "desiccate" means broadly to dry and includes loss of cellular fluids, followed by degradation of chlorophyll (Chl) and other biomolecules such as proteins, lipoproteins, and nucleic acids, and disintegration of subcellular organelles such as vacuoles, nuclei, mitochondria, plastids, microsomes and microbodies.

Detailed Description Text (63):
As used herein, the term "chlorophyll biosynthesis modulator" refers to a compound other than exogenous ALA (ALA from sources outside the plant) which causes the green tissue of a plant, e.g., foliage, to accumulate levels of tetrapyrroles which are higher than levels of tetrapyrroles normally found in untreated green tissue. Such modulators are selected from the group consisting of inducers of ALA synthesis, enhancers of ALA conversion to tetrapyrroles and inhibitors of conversion of divinyl tetrapyrroles to monovinyl tetrapyrroles. In accordance with the invention, one or more modulators, or one or more modulators in combination with ALA can be used to effect defoliation or defoliation and fruit drop in plants.

Detailed Description Text (74):
In order to determine whether a compound acts as a tetrapyrrole-dependent photodynamic herbicide modulator, the chemical is usually sprayed on a plant with and without ALA, and the treated plant is kept in darkness for several hours during which tetrapyrrole accumulation takes place. After dark incubation and prior to light exposure, the plant tissues are analyzed for tetrapyrrole content. Upon exposure to light, tissues that had accumulated tetrapyrroles in darkness, exhibit rapid photodynamic damage within the first hour of illumination. The classification of a modulator as an enhancer, inducer or inhibitor of tetrapyrrole accumulation is then determined from the pattern of tetrapyrrole accumulation in the presence and absence of ALA and modulators.

Detailed Description Text (77):
Thus, the compositions of the present invention can also comprise combinations of ALA and one or more chlorophyll biosynthesis modulators selected from the group consisting of inducers, enhancers, and inhibitors, e.g., ALA+one or more inducers, ALA+one or more enhancers, ALA+one or more inhibitors, ALA+one or more inducers+one or more enhancers, ALA+one or more inducers+one or more inhibitors, ALA+one or more enhancers+one or more inhibitors, ALA+one or more inducers+one or more enhancers+one or more inhibitors, etc.

Detailed Description Text (78):
A consideration of one or more of the following factors will enable one skilled in the art to effect the desired defoliation and/or fruit drop for a given plant species: the species of the plant (monocot, dicot, annual, perennial, woody, non-woody); the age of the plant; the various tissues types present on the plant (cotyledons; stems, leaves, leaf petioles, growing points, fruit pedicels, bark, etc.); and the point of time in the growing season. For example, (a) spraying a plant with woody branches will result in the desiccation of the green leaves but not the woody branches because the woody branches are protected by suberized bark which does not respond to treatment by accumulating tetrapyrroles; (b) spraying a young plant with tender, succulent stems containing chlorophyll will desiccate both the leaves and the stems, while treatment of plants with branches protected by suberized bark will result in desiccation of the leaves only; (c) spraying stems containing green leaves and unprotected growing points (e.g., leaf and flower buds) will desiccate both the leaves and the growing points, while spraying stems with leaves and growing points protected by suberized scales will only desiccate the leaves leaving the protected growing points unaffected; (d) spraying plants with young and old leaves may result in the desiccation of a larger proportion of the old or young leaves, depending on the nature of the modulator (i.e., inducer, enhancer or inhibitor) used with ALA; (e) spraying an annual plant with few carbohydrate reserves will result in desiccation followed by a slower rebound than a perennial plant with more carbohydrate reserves; and (f) spraying a woody plant, with carbohydrate reserves stored in the woody stems and roots, at the end of the growing season will result in desiccation of the leaves without resprouting of new leaves,

while spraying the same plant early in the growing season will result in desiccation of the treated leaves, but with regeneration of new leaves from the carbohydrate reserves stored in the stems and roots, given proper temperature and daylength conditions.

Detailed Description Text (95):
The next morning, the treated plants were sampled for their tetrapyrrole content. The plants were taken in the black boxes to a dark room equipped with a green safelight which permits the manipulation of the treated tissues without affecting in any way their tetrapyrrole content. One of each two cotyledons of every two replicates was excised. Two- to three-gram batches were then homogenized in a Sorval Omnimixer (DuPont Instruments, Newtown, Conn.) in acetone:0.1 N NH.sub.4 OH (9:1 v/v) at a rate of 18 ml of solvent per 3 g of tissue. The resulting 80% acetone extract containing various tetrapyrroles was cleared from lipoproteins and cell debris by centrifugation at 39,000.times.g for 10 min at 0 .degree. C. Chlorophyll, a fully esterified tetrapyrrole, was removed from the aqueous acetone solution by extraction with hexane according to the method of Rebeiz, C. A., Mattheis, J. R ., Smith, B. B., Rebeiz, C. C., and Dayton, D. F. Arch. Biochem. Biophys. 166:446-465 (1975). The more polar mono- and dicarboxylic tetrapyrroles such as Proto, MP(E), and Pchlide remained in the hexane-extracted aqueous acetone fraction. The chemical structure of these tetrapyrroles has been discussed at length in Rebeiz, C. A. and Lascelles, J., in Photosynthesis: Energy Conversion by Plants and Bacteria, Vol. 1, Govindjee, ed. (Academic Press, New York, 1982), pp. 699-780; and Rebeiz, C. A., Wu, S. M., Kuhadja, M., Daniell, H., and Perkins, E. J. Mol. Cellular Biochem. 57:97-125 (1983). The amount of Proto, MP(E), and Pchlide was determined spectrofluorometrically on aliquots of the hexane-extracted acetone fraction according to the method of Rebeiz, C.A., Mattheis, J. R., Smith, B. B., Rebeiz, C. C., and Dayton, D. F., Arch. Biochem. Biphys. 171:549-567 (1975). A small aliquot of the hexane extract containing the Chl a and b was dried under N.sub.2 gas and the residue was redissolved in 80% acetone. The amount of Chl and b in this acetone solution was then determined spectrofluorometrically according to the method of Bazzaz, M. B., and Rebeiz, C. A., Photochem. Photobiol. 30:709-721 (1979).

Detailed Description Text (138):
After homogenization, extracts were centrifuged at 18,000 rpm for 12 min. at 1.degree. C. to separate lipoproteins and cell debris from the supernatant containing tetrapyrroles. Chlorophyll and other fully esterified tetrapyrroles were removed by first extracting the supernatant with hexane followed by an equal volume of hexane and then with a 1/3 volume of hexane (Rebeiz, C. A., Mattheis, J. R., Smith, B. B., Rebeiz, C. C., and Dayton, D. F. Arch. Biochem. Biophys. 171:549-567 (1975)). Protoporphyrin IX (proto), Mg-protoporphyrin monoester (MPE), and protochlorophyllide (Pchlide) remained in the hexane-extracted acetone fraction (HEAF). The amount of tetrapyrroles in the HEAF was determined by spectrofluorometry.

Detailed Description Text (191):
Chlorophyll Biosynthesis Modulators

Detailed Description Text (200):
Chlorophyll Biosynthesis Modulators For TDPH Activity

Detailed Description Text (213):
Effect of TDPH on Tissues Lacking Chlorophyll

CLAIMS:

25. A method for inducing the accumulation of photodynamic tetrapyrroles in a whole, green plant, said method comprising contacting said whole, green plant with an effective amount of .delta.-aminolevulinic acid in combination with one or more chlorophyll biosynthesis modulators and a suitable carrier, at a concentration of from about 1 to about 40 mM of .delta.-aminolevulinic acid and from about 5 to about 30 mM of chlorophyll biosynthesis modulators, wherein said chlorophyll biosynthesis modulator is selected from the group consisting of:
2,9-dimethyl-4,7-diphenyl-1,10-phenanthroline,

3,4,7,8-tetramethyl-1,10-phenanthroline,

5-chloro-1,10-phenanthroline,

5,6-dimethyl-1,10-phenanthroline,

5-methyl-1,10-phenanthroline,

5-nitro-1,10-phenanthroline,

4,7-dimethyl-1,10-phenanthroline,

4,7-diphenyl-1,10-phenanthroline,

1,10-phenanthroline,

4-methyl-1,10-phenanthroline,

4,4'-dimethyl-2',2'-dipyridyl,

2,2':6',2"-terpyridine,

2,2'-dithiobis(pyridine N-oxide),

6,6-dithiodinicotinic acid,

5-amino-2-methoxypyridine,

2,3-dihydroxypyridine,

2-hydroxy-4-methylpyridine,

isocarbostyryl,

3-amino-2,6-dimethoxy pyridine, HCl,

2-chloro-6-methoxypyridine,

3-cyano-2,6-dimethyl-2-hydroxypyridine,

dibucaine hydrochloride,

2-hydroxy-3-nitropyridine,

2,6-dimethoxypyridine,

citrazinic acid,

di-2-pyridyl ketone oxime,

phenyl 2-pyridyl ketoxime,

8-hydroxy-5-nitroquinoline,

5-chloro-8-hydroxy-7-iodoquinoline,

5,7-dichloro-8-hydroxyquinoline,

5,7,dibromo-8-hydroxyquinoline,

N-benzyl-N-nicotoyl nicotinamide,

N-methylnicotinamide,

ethyl 2-methylnicotinate,

niflumic acid,

2-hydroxynicotinic acid,

diethyl 3,4-pyridine dicarboxylate,

ethyl nicotinate,

2-hydroxy-6-methylpyridine-3-carboxylic acid,

4-hydroxy-7-trifluoromethyl-3-quinolinecarboxy,

dimidium bromide monohydrate,

ethidium bromide,

propidium iodide hydrate,

phenanthridine,

sanguinarine chloride,

3-hydropicolinic acid,

picolinic acid,

1-isoquinoline carboxylic acid,

2-[4-(dimethylamino)styryl]-1-ethylpyridinium,

2-[4-(dimethylamino)styryl]-1-methylpyridinium,

berberine hydrochloride hydrate,

bis-N-methyl acridinium nitrate,

1-(carboxymethyl)pyridinium chloride,

5-phenyl-2-(4-pyridyl)oxazole,

1,1-diethyl-2,2-cyanine iodide,

1,1-diethyl-2,4-cyanine iodide,

1,1-diethyl-4,4-cyanine iodide,

1-dodecylpyridinium chloride monohydrate,

2,4,6-collidine p-toluene sulfonate,

1-ethyl-3-OH-pyridinium bromide,

4-(dimethylamino)bromide perbromide,

6-nitroquinoline,

8-nitroquinoline,

5-nitroquinoline,

4,7 phenanthroline,

1,7 phenanthroline,

methyl 3-chlorocarbonyl-L-thiazolidine-4-carboxylate,

(-)-2-oxo-4-thiazolidine carboxylic acid,

5-(4-diethylaminobenzylidene)-rhodamine,

5-chloro-2-mercaptobenzothiazole,

5-(4-dimethylamino benzylidine)rhodinine,

4-(4-biphenyllyi)2-methyl thiazole,

3-(4-chlorophenyl)-2-ethyl-2,3,5,6-tetrahydroimidazo[2,1-b]thiazol-3-ola,

3,3-diethylthiocarbocyanine iodide,

2-amino-6-fluorobenzothiazole,

2-amino-5,6-dimethylbenzothiazole,

2-(4-aminophenyl)-6-methylbenzothiazole,

2-bromothiazole,

(+)6-aminopenicillanic acid,

2-Amino-6-nitrobenzothiazole,

2-Acetylthiazole,

Basic blue 66,

3,6-dimethylbenzothiazole,

4,5-dimethylthiazole,

2-[4-(dimethylamino)styryl]-3-ethylbenzothiazolium iodide,

2-bromo-5-nitrothiazole,

2-cyano-6-methoxybenzothiazole,

ethyl 2-amino-4-thiazole acetate,

3-methylbenzothiazole-2-thione,

2-4-thiazolidinedione,

2-(4-aminophenyl)-6-methylbenzothiazole,

2-amino-alpha-(methoxyimino)-4-thiazole acetic acid hydrochloride,

2-aminobenzothiazole,

2-amino-2-thiazoline,

2-(4-thiazolyl)benzimidazole,

ethyl 2-(formylamino)-4-thiazolegloxylate,

thioflavin T,

ethyl 2-amino-alpha-(methoxyimino)-4-thiazole acetate,

2-(tritylamino)-alpha-(methoxyimino)-4-thiazole acetic acid hydrochloride,

1-phenyl-3-(2-thiazolyil-2-thiourea),

pseudothiohydintoin,

3,3'-(4,4'-biphenylene)bis(2,5-diphenyl-2H-tetrazolium chloride),

blue tetrazolium,

2,3,5-triphenyl-2H-tetrazolium chloride,

N-(4-dimethylamino-3,5-dinitrophenyl)-maleimide,

bilirubin,

trans-4-hydroxy-L-proline,

alpha-methyl-alpha-propyl-succinimide,

N-hydroxysuccinimidyl acetoacetate,

N-(9-fluorenylmethoxycarbonyloxy)succinimide,

4-pyrrolidinopyrridine,

1-[2-(4-bromophenoxy)ethyl]pyrrolidine,

(S)-(+)-ethyl-2-pyrrolidine-5-carboxylate,

(-)-cotinine,

tert-butyl 4-acetyl-3,5-dimethyl-2-pyrrolecarboxylate,

pyrrolo (1,2-a) quinoxaline,

pyrrole-2-carboxaldehyde,

ethyl 3,5-dimethyl-2-pyrrolecarboxylate,

3-ethyl-2-methyl-4,5,6,7-tetrahydroindol,

1-methyl-2-pyrrolecarboxylic acid,

1-methyl-2-pyrrolecarboxaldehyde,

1-furfurylpyrrole,

1-(dimethylamino) pyrrole,

1-(2-cyanomethyl)pyrrole,

diethyl 2,4-dimethylpyrrole-3,5-dicarboxylate,

methyl 5-(benzoxycarbonyl)-2,4-dimethyl-3-pyrrole,

4-methyl-2-pyrazolin-5-one,

3,4-dimethyl-1-phenyl-3-pyrazolin-5-one,

pseudothiohydrantoin,

3,3'-dipropyloxacarbocyanine iodide,

3,3'-dimethyloxacarbocyanine iodide,

2,5-diphenyloxazole,

2-mercaptobenzoxazole,

3-methyl-2-oxazolidinone,

2-chlorobenzoxazole,

2-(4-biphenylyl)-5-phenyl-oxazole,

2-benzoxazolinone,

2,5-bis(4-biphenylyl)oxazole,

3,3'-dihexyloxacarbocyanine iodide,

3,3'-diethyloxacarbocyanine iodide,

2,5-dimethyl-benzoxazole,

2-mercaptoimidazole,

2-mercapto-1-methylimidazole,

6-thioxanthine,

2,4,5-triphenylimidazole,

4,5-diphenylimidazole,

guanosine hydrate,

2-ethyl-4-methyl-imidazole,

4,5-dicyanoimidazole,

1-(mesitylenesulfonyl)-imidazole,

2,2'-dithiobis(4-tert-butyl-1-isopropylimidazole),

inosine-5'-triphosphate, disodium salt dihydrate,

1-(2,4,6-triisopropylbenzenesulfonyl)imidazole,

nitrofurantoin,

kinetin,

1,10-phenanthroline,

4-methyl-1,10-phenanthroline,

5-methyl-1,10-phenanthroline,

26. A method of controlling undesirable, whole, green plants, said method comprising contacting said undesirable, whole, green plants with an effective amount of .delta.-aminolevulinic acid in combination with one or more chlorophyll biosynthesis modulators and a suitable carrier, at a concentration of from about 1 to about 40 mM of .delta.-aminolevulinic acid and from about 5 to about 30 mM of chlorophyll biosynthesis modulators, wherein said chlorophyll biosynthesis modulator is selected form the group consisting of:

2,9-dimethyl-4,7-diphenyl-1,10-phenanthroline,

3,4,7,8-tetramethyl-1,10-phenanthroline,

5-chloro-1,10-phenanthroline,

5,6-dimethyl-1,10-phenanthroline,

5-methyl-1,10-phenanthroline,

5-nitro-1,10-phenanthroline,

4,7-dimethyl-1,10-phenanthroline,

End of Result Set

L12: Entry 21 of 21 File: USPT Dec 1, 1981

DOCUMENT-IDENTIFIER: US 4303610 A
TITLE: Test kit for field analysis of plant tissue magnesium and calcium

Abstract Text (1):
A test kit for field analysis of plant tissue magnesium and calcium contains a cork borer for sampling plant tissue, a grinder for particulating the plant tissue sample, and a funnel holder that is capable of being attached to the test kit container. Furthermore, the test kit contains a syringe that is attached to the exit end of a filtration funnel, with the attachment being through the intermediacy of a tube. Attachment of the syringe to the filtration funnel enables vacuum filtration to be carried out in the field.

Brief Summary Text (2):
This invention relates to a portable test kit for field analysis of plant tissue. More particularly, the invention relates to a test kit for analysis of plant tissue magnesium and calcium in the field.

Detailed Description Text (3):
Inside test kit container 11, the testing implements and reagent bottles used in field analysis of the magnesium and calcium content of plant tissue are stored. The plant tissue used in the analysis is a plant leaf. A plant is not analyzed for magnesium after the fruit is formed.

Detailed Description Text (4):
Cork borer 17 is used to take plugs of plant tissue from the plant being analyzed. This implement is advantageously a #14 borer. When a #14 borer is used, about 16 to 20 leaf plugs are required to form a suitable sample size of about 1.0 gram. Thicker leaves require a fewer number of plugs to form the sample than thinner leaves require. The plant tissue samples are ground thoroughly in a grinder such as grinder 18, which is novel and disclosed in the copending patent application of Jerry W. Moore and James Allen, filed on the same date as this application, and entitled "Grinding Apparatus", and assigned Ser. No. 150,711. Grinder 18 is comprised of a reamer 19 having V-shaped teeth 20 and of a cup 21, the inner bottom surface 22 of which is formed with teeth having an identical V-shaped configuration. The ground plant tissue is washed from grinder 18 into beaker 23 using a measured quantity of a deionized aqueous solvent, which is advantageously deionized water. About 30 ml of deionized water is useful for this purpose. Transfer of the ground plant tissue may be assisted by scraping some of the tissue from grinder 18 and then washing grinder 18 with the dieonized aqueous solvent. Container 11 contains either deionized water or a resin 24 for demineralizing water, and contains a graduated flask 25 for measuring the 30 ml volume.

Detailed Description Text (25):
This invention is useful for field analysis of the magnesium and calcium content of plant tissue. Magnesium in several ways is to a plant as iron is to the human body. It aids in the manufacture of chlorophyll, in fruit production and in the utilization of other nutrients. Without magnesium the plant will grow pale green and probably die. Magnesium is particularly used by the plant when under stress, for example, when the plant is growing, flowering, making seed or in the need of water.

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☐ 1. Document ID: US 6448476 B1

L13: Entry 1 of 6 File: USPT Sep 10, 2002

US-PAT-NO: 6448476
DOCUMENT-IDENTIFIER: US 6448476 B1

TITLE: Plants and plant cells transformation to express an AMPA-N-acetyltransferase

DATE-ISSUED: September 10, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Barry; Gerard F.	St. Louis	MO		

US-CL-CURRENT: 800/300; 435/193, 435/411, 435/413, 435/414, 435/415, 435/416, 435/417, 435/418, 435/419, 435/422, 435/427, 435/468, 435/471, 435/69.7, 435/69.8, 800/278, 800/287, 800/288, 800/298

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 2. Document ID: US 6270809 B1

L13: Entry 2 of 6 File: USPT Aug 7, 2001

US-PAT-NO: 6270809
DOCUMENT-IDENTIFIER: US 6270809 B1

TITLE: Nutritional supplements

DATE-ISSUED: August 7, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Ensley; Burt D.	Newton	PA		
Elless; Mark	Mount Laurel	NJ		
Blaylock; Michael J.	Dayton	NJ		
Huang; Jianwei	Plainsboro	NJ		

US-CL-CURRENT: 424/617; 424/600, 424/630, 424/639, 424/641, 424/646, 424/650, 424/655, 424/657, 424/682, 424/702, 426/74 , 514/492, 514/494, 514/499, 514/501, 514/502, 514/505

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 3. Document ID: US 6242261 B1

L13: Entry 3 of 6 File: USPT Jun 5, 2001

US-PAT-NO: 6242261
DOCUMENT-IDENTIFIER: US 6242261 B1

TITLE: Assessment of ion availability in heterogeneous media using ion-exchange membranes

DATE-ISSUED: June 5, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Schoenau; Jeffrey John	Central Butte			CA
Huang; Weize	Saskatoon			CA

US-CL-CURRENT: 436/26; 210/263, 210/638, 422/61, 436/171, 436/178, 436/28

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 4. Document ID: US 5972679 A

L13: Entry 4 of 6 File: USPT Oct 26, 1999

US-PAT-NO: 5972679
DOCUMENT-IDENTIFIER: US 5972679 A

TITLE: Cold tolerances in plants

DATE-ISSUED: October 26, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Griffith; Marilyn	Waterloo			CA

US-CL-CURRENT: 435/204; 435/205, 435/209, 530/350, 530/370, 530/372, 530/379

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 5. Document ID: US 5917117 A

L13: Entry 5 of 6 File: USPT Jun 29, 1999

US-PAT-NO: 5917117
DOCUMENT-IDENTIFIER: US 5917117 A

TITLE: Inducing hyperaccumulation of metals in plant shoots

DATE-ISSUED: June 29, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Ensley; Burt D.	Newtown	PA		
Blaylock; Michael J.	Daytoin	NJ		
Dushenkov; Slavik	East Brunswick	NJ		
Kumar; Nanda P.B.A.	New Brunswick	NJ		
Kapulnik; Yoram	Ness Ziona			IL

US-CL-CURRENT: 75/711; 210/602, 75/712

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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☐ 6. Document ID: US 5852172 A

L13: Entry 6 of 6 File: USPT Dec 22, 1998

US-PAT-NO: 5852172
DOCUMENT-IDENTIFIER: US 5852172 A

TITLE: Cold tolerances in plants

DATE-ISSUED: December 22, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Griffith; Marilyn	Waterloo			CA

US-CL-CURRENT: 530/379; 435/204, 435/205, 435/209, 530/360, 530/370, 530/372

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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L13: Entry 2 of 6 File: USPT Aug 7, 2001

DOCUMENT-IDENTIFIER: US 6270809 B1
TITLE: Nutritional supplements

Other Reference Publication (14):
Davidsson, L., et al., "Iron Bioavailability Studied in Infants: The Influence of Phytic Acid and Ascorbic Acid in Infant Formulas Based on Soy Isolate," Pediatric Research 36(6):816-822 (1994).

Other Reference Publication (20):
Jones, J. B., et al., "Sampling, Handling, and Analyzing Plant Tissue Samples," in Soil Testing and Plant Analysis, 3d Ed., Chap.15, pp. 389-427 (Soil Science Society of America, Inc. 1990).